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ABSTRACT

The purpose of this study was to investigate the effects of a sequenced, highly-structured direct instruction program in language and reading skills on the intellectual growth, academic achievement, and school adjustment of 303 middle class kindergarten children. Children were assigned to one of four treatment groups: a "direct verbal" instruction language program, a "direct verbal" instruction reading program, a programmed reading program and the traditional kindergarten program which served as a control group. Results indicated that children in the experimental groups performed better on most intellectual and achievement measures at the end of kindergarten. Reading gains remained at the end of first grade. There were significant differences at the end of first grade in school adjustment favoring the experimental groups. Structured instruction can apparently be used successfully in kindergarten. (ST)

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FINAL REPORT

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THE EFFECTS OF STRUCTURED INSTRUCTION ON KINDERGARTEN PUPILS

BERNARD SINGER

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CHAPTER I

Introduction

Background of the Study

In recent years there has been a renewed interest in the value of early education. A number of studies have indicated that cognitive growth can be accelerated as the result of direct instruction in verbal skills. Other studies have indicated that four and five-year old disadvantaged children can learn basic language and reading skills more effectively by certain structured, carefully sequenced approaches than by the informal, unstructured approach of the typical nursery and kindergarten. A number of studies also indicated that early instruction resulted in improved pupil adjustment.

One of the studies which produced impressive results in both cognitive growth and academic achievement was conducted by Bereiter (1967) with four and five-year old disadvantaged children. A unique teaching approach, "direct verbal" instruction, was developed which utilized highly verbal teacher-pupil interaction as one of its distinguishing features. Several follow-up studies (Erikson et al., 1969; Di Lorenzo et al., 1969; Karnes et al., 1969) were conducted using the "direct verbal" instruction program. In all of these studies significantly superior results were

reported for the "direct verbal" instruction program.

The demonstrated effectiveness of the "direct verbal" instruction program with young disadvantaged children raises the possibility that this program may also be effective with children from more privileged backgrounds. This possibility is supported by the results of a pilot [redacted] Bereiter (1967) conducted with middle-class children. [redacted]this study significantly superior gains were made by pre-school middle-class children in reading, spelling and arithmetic as the result of the "direct verbal" instruction program. Four year old middle-class children in a Montessori school were compared with four year old middle-class children in a "direct verbal" instruction program. The findings at the end of seven months of instruction were as follows:

> Mean grade level scores for the direct instruction groups and the Montessori groups, respectively, were 1.46 and 1.19 on arithmetic; 3.43 and 1.01 on reading; and 1.72 and 1.25 on spelling (p. 186).

The reading scores indicated that for middle-class children, "reading seems to come easily enough for four year olds that there is little reason to delay it another two years (p.189)." "Direct verbal" instruction had little effect on the oral language abilities of middle-class children as measured by the Illinois Test of Psycholinguistic Abilities.

Although the effects of "direct verbal" instruction on language abilities were insignificant in this study,

the effects on academic achievement were substantial, indicating that structured, verbal instruction has value for pre-school middle-class children as well as for disadvantaged children.

Further support for the value of structured, verbal instruction for young children comes from the writings and research of Ausubel. Ausubel (1963) cites empirical evidence to point out the positive value of systematic, verbal instruction at all ages. He supports the use of simple, didactic instruction as opposed to learning by discovery. Bruner (1965), although strongly in favor of a discovery approach to learning, also supports the value of structure and early training. Vygotsky (1962) reached the conclusion that verbal instruction at early ages is of great value for cognitive development. Research conducted in the Soviet Union with very young children supports the value of early verbal instruction as reported by Smith & Miller (1968) and by Bronfenbrenner (1970). The official Soviet manual, translated by Educational Testing Service, (1969), for nursery school teachers stresses the importance of verbal instruction from the earliest ages.

The value of verbal instruction for young children is not universally accepted. Piaget (1952) and his followers take the position that actual experience with concrete objects is of greater value for pre-school children than

verbal instruction. Montessori (1964) believed that the best way to develop cognitive abilities was to provide manipulative materials for children to work with. The disagreement over the relative value of verbal instruction as compared with concrete activities points to the need for further study.

The importance of early childhood years for intellectual development has been touched upon by various educators, psychologists and philosophers over the years, but it has only recently been accorded the emphasis it deserves. There is increasing evidence that the early ages may be the optimum period for intellectual growth as demonstrated by Bloom (1964).

The writings of Froebel in the 19th century called attention to the importance of early education. Froebel placed great emphasis upon play and socialization. Froebel's influence was very great and his philosophy still prevails to a large extent in nursery schools and kindergartens.

Montessori injected an emphasis upon work rather than play, together with a highly structured, multi-sensory program using many didactic materials. With this approach, it was found that children could learn the three "R's" at a very early age. However, Montesorri's program was never adopted by kindergartens in the U.S.. A few private

Montessori nursery schools have operated in the U.S. over the years. Recently, due to a revival of interest in the Montessori program, many new Montessori schools have been founded in the U.S..

An important contribution made by both Montessori and Piaget was the knowledge that children develop through certain stages during which times certain learning tasks can be much more readily absorbed and retained than at any other time. For example, it was observed that learning a language occurs much more readily at an early age than at later ages, Oram (1968). Observations at the Gesell Institute also provided data on optimum periods for educational tasks. Ilg & Ames (1965) reported that, ".....the printing of letters becomes a passion to many five and even some four year olds." Montessori had made the same observation many years earlier.

O. K. Moore (1963) found that very young children could learn to read without any undue strain on the child by the use of the "talking typewriter." Dolores Durkin (1964) found that early readers were ahead of non-early readers through the elementary grades. The less able children in this study benefited more from an early start. Scott & Pavelko (1962) found that five and six year olds were not only able to learn letter names and letter sounds, but were also able to systematically apply their knowledge to their reading and writing skills.

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In spite of the evidence mentioned above to the effect that very young children can learn the three "R's", there is considerable opposition to providing formal education to children before the first grade. Kindergarten curriculum builders find that there are two opposing camps on the issue of when and how much formal learning should be introduced in the kindergarten. Although there is disagreement as to the overall effects of early childhood education, there are sufficient beneficial aspects to early interventions already indicated, to warrant further investigation.

An indication of the value now being placed on structured, direct instructional approaches for young children is shown by the recent change of policy in the State of New Jersey in regard to reading instruction at the kindergarten level. In 1969 the New Jersey State Board of Education rescinded a long-standing policy prohibiting the formal teaching of reading in kindergarten, thus making it permissible to teach reading in kindergarten.

Statement of the Problem

As a result of the above-mentioned developments in the field of early education, there is a need to find answers to the following questions:

1. Are basic skills which are related to academic success being taught as effectively as they can be in the traditional kindergarten?

2. Can middle-class kindergarten children learn basic skills in language and reading by structured, direct instruction programs without adverse effects?
3. Can certain "direct verbal" instruction programs which were found to be very effective with young disadvantaged children be equally effective with middle-class kindergarten pupils?
4. Can intellectual growth be accelerated in middle-class children as the result of "direct verbal" instruction in language concept development?
5. Will any significant gains achieved in kindergarten be maintained permanently?

Purpose of the Study

This study is being made for the purpose of finding out what effects a sequenced, highly-structured "direct instruction" program in language and reading skills will have on the intellectual growth, academic achievement, and school adjustment of middle-class kindergarten children.

The direct instruction studies mentioned above have indicated that pre-school and kindergarten age children can make superior gains in academic achievement and IQ while in small groups in a laboratory situation. Most of these studies were made with disadvantaged children. It is the purpose of this study to find out what effects such an approach will have on middle-class children in the regular kindergarten classroom. The original studies were made with three different teachers working together

as a team with only about fifteen children in a class. Each teacher taught only one of the three subjects; i.e., arithmetic, language or reading. This study will help to determine whether the direct instruction program can be effective in a regular kindergarten classroom with one teacher and about twenty-five children in each class.

In addition to obtaining data on pupil achievement, another objective of this study will be to ascertain what effects a highly structured, formal instruction program will have on the adjustment of kindergarten children. One of the reasons, in the past, for delaying formal instruction until first grade has been the fear that young children would somehow be adversely affected by such instruction. A distaste for school or a poor attitude towards learning might develop according to this view. This view is not justified, according to the results of a study of pupil reactions in a pre-school direct instruction program as reported by Erikson et al., (1969). This study showed that young children taught by a formal, highly structured approach were more adjusted than children who were taught by informal, unstructured approaches.

Significance of the Problem

One of the chief outcomes of this study will be the determination of whether middle-class kindergarten children can derive significant benefits from structured, direct

verbal instruction in oral language and reading skills, in terms of academic achievement and intellectual growth.

The data from this study may shed some light on the apparent conflict in theories dealing with cognitive growth. A critical problem which should be resolved is the relative importance of concrete experience as compared to verbal instruction. For example, Piaget's theory of cognitive growth stresses the importance of concrete activities rather than verbal learning as the major influence in cognitive growth. Other psychologists such as Vygotsky stress the importance of language as the most important factor in cognitive growth. Any data which can help to resolve this problem would have great value for those persons responsible for determining curriculum, particularly in the field of early education.

There are a number of other contributions to education which may be expected from this study. The findings may furnish evidence for possible follow-up studies to resolve the following questions: (1) What percentage of middle-class kindergarten children can be expected to learn to read as the result of structured, direct instruction? (2) Will the learning of basic reading and language skills in kindergarten help to reduce the number of children who will later require special remedial instruction in reading or specific language disabilities?

(3) Can early structured instruction provide significant, permanent gains in IQ and academic achievement for middle-class children?

Definition of Terms

Cognitive. The intellectual process by which knowledge is gained about objects and ideas, including both awareness and judgment.

Direct Instruction. This includes the large range of normal teaching activities that involve demonstrating, telling and asking. It includes pupil-teacher verbal interaction and teaching for specific objectives.

Direct Verbal Instruction. Includes all of the procedures in "direct instruction" with the addition of an intensive verbal interaction between the teacher and the pupils.

Intellectual Growth. Refers to intellectual growth as measured by the Kuhlmann-Anderson Test based on pre- and post-IQ scores.

Structured Instruction. This term refers to instruction which follows a carefully planned, sequential development for specific objectives "laid out in advance."

Treatment One, Distar Language. A modified version of the original program set up by Bereiter and Engelmann for disadvantaged children to accelerate cognitive growth by improving verbal skills and concept development.

Treatment Two, Distar Reading. A modified version of the original Bereiter-Engelmann reading program which was designed to impart basic reading skills to disadvantaged children. It is a carefully sequenced and highly structured program. The Distar programs are now published by S.R.A..

Treatment Three, Programmed Reading. A series of Text-workbooks for Grades One through Three, published by McGraw-Hill. This is a highly structured, programmed method of teaching reading. It includes a vocabulary controlled for regularity and is paced slowly enough to insure mastery of each concept.

Treatment Four, Traditional Kindergarten. A method largely based on an informal, unstructured approach with the emphasis upon socialization and readiness activities. It includes an unstructured approach to the teaching of language and reading skills.

The Hypotheses

The major purpose of this study is to test the following hypotheses:

1. Middle-class children taught with a "direct verbal" instruction language program in kindergarten will achieve significantly higher scores on achievement tests and IQ tests than will middle-class children in the traditional kindergarten program.

2. Middle-class children taught with a "direct verbal" instruction reading program in kindergarten will achieve

significantly higher scores on reading and spelling achievement tests than will middle-class children in the traditional kindergarten program and all other treatment groups.

3. Middle-class children taught with a "programmed reading" program will achieve significantly higher scores on reading and spelling achievement tests than will middle-class children in the traditional kindergarten program.

4. The children in the experimental instruction programs will be better adjusted to school than the children in the traditional kindergarten program as measured by a standardized behavior rating scale.

Organization of the Study

This experimental study was designed to test the four hypotheses mentioned above. Four treatment groups were set up covering four methods of instruction for the kindergarten pupils: a "direct verbal" instruction language program, a "direct verbal" instruction reading program, a programmed reading program, and the traditional kindergarten program which will act as the control group. Two public schools were enlisted to provide a sample of the total public school kindergarten population in East Brunswick, New Jersey.

The kindergarten pupils at the McGinnis School and at the Warnsdorfer School were partially* randomly assigned by

*Subjects were assigned to A.M. or P.M. sessions prior to randomization.

sex to the 12 classes in the two schools. Twelve classes participated in the experiment. One-half of the subjects were in experimental classes and the other half in control classes. The pupils at the two schools came from different sections of the community, thus being representative of the total population.

The four treatment groups were assigned among the 12 classes in such a way that each of the six teachers were assigned to teach one experimental class and one control class as illustrated in Table I. This was possible because each teacher had one A.M. and one P.M. class. The three experimental programs were taught for a period of thirty to forty minutes each school day. The balance of the time in the experimental classes was devoted to the usual kindergarten program.

During the Fall of the kindergarten year, all of the subjects were pre-tested with the following tests: Kuhlman-Anderson Intelligence Test, Stanford Early School Achievement Test-Level I and the Child Behavior Rating Scale. The Wide Range Achievement Test was given to 100 pupils only. Instruction in the four treatment groups was given for a period of six and one-half months between pre- and post-testing.

During the Spring of the kindergarten year, all of the subjects were post-tested with all the tests mentioned above. In addition, the Word Reading subtest of the Stanford Early School Achievement Test-Level II was administered to all the subjects as a post-test.

During the Fall of the first grade, all of the subjects were pre-tested with the following tests: Kuhlman-Anderson Intelligence Test, Stanford Early School Achievement Test-Level II, Wide Range Achievement Test, and the Child Behavior Rating Scale.

During the Spring of the first grade, all of the subjects were post-tested with all of the tests mentioned above. There was an interval of seven months of instruction between pre- and post-testing.

The data obtained from the pre- and post-tests were subjected to statistical treatment to determine any significant differences between the treatment groups. The test scores were subjected to analysis of covariance to adjust for initial differences in treatment groups as indicated by pre-test scores.

The experimental design for the kindergarten study is shown in Table 1.

TABLE 1
Experimental Design for the Kindergarten Study.

	A.M.	n	P.M.	n
Teacher 1	(T-1) *	24	(T-4)	25
Teacher 2	(T-4)	25	(T-1)	26
Teacher 3	(T-2)	26	(T-4)	25
Teacher 4	(T-4)	25	(T-2)	26
Teacher 5	(T-3)	26	(T-4)	25
Teacher 6	(T-4)	25	(T-3)	25
		151		152

*T-1 Treatment 1. (Distar Language)
T-2 Treatment 2. (Distar Reading)
T-3 Treatment 3. (Programmed Reading)
T-4 Treatment 4. (Traditional - Control)

The experimental design for the first grade follow-up study is shown in Table 34. The first grade follow-up was conducted in order to determine whether there were any long term effects due to kindergarten treatments. The methods, procedures and result of the study are described in the following chapters. Chapters 2 and 3 cover the kindergarten period and Chapters 4 and 5 cover the first grade. In Chapter 6 conclusions, implications, and recommendations are presented for the entire study.

CHAPTER II

Methods and Procedures

Kindergarten

The Subjects

The 303 original subjects of this experimental study were the total population of children who attended the twelve kindergarten classes at the Warnsdorfer and McGinnis Schools in East Brunswick, New Jersey. East Brunswick is largely a middle-class suburban community. The racial composition of the population was 298 white, two Negroes, two Puerto Rican, and one Oriental. The subjects were typical middle-class children. Middle-class status was determined by the use of "Warner's Seven-Point Rating Scale of Father's Occupation," father's education, mother's education and size of family. Warner (1960) pointed out that the Occupational Rating Scale correlates highly with all other indicators of social class.

The description of the population which emerged from a questionnaire (See Appendix I) analysis and school records produced the data for Table 2. The fathers of the middle-class children under study had an average occupational rating of 2.6 on the 7-point scale. The distribution among the seven categories is as follows:

Rating	N	Rating	N
1	72	5	23
2	69	6	12
3	48	7	0
4	27		

The number of fathers whose occupational rating was in the lower categories of 5 and 6 totaled only 35. The above-mentioned

Table 2

Data on Subjects and Their Families

Treatment	Subjects		Families									
	No.	Pre-Test Mean IQ	Warner's Rating of Father's Occupation							Mean Family Size	Mean Father's Ed., Yrs.	Mean Mother's Ed., Yrs.
			Mean	1	2	3	5	5	6			
Distar Language	24	104.83	2.1	10	10	2	2	1	1	4.8	----	----
Control	25	105.54	2.1	9	7	3	1	1	0	5.3	----	----
Control	25	106.88	2.4	8	7	1	1	2	2	4.1	14.7	12.9
Distar Language	26	105.28	2.8	4	8	4	2	2	2	5.0	14.5	13.4
Distar Reading	26	102.96	2.5	7	4	5	3	2	0	5.1	14.5	13.0
Control	25	104.13	2.9	3	4	4	2	3	0	5.3	14.1	13.8
Control	25	106.92	2.6	5	3	9	3	1	0	4.9	14.2	14.8
Distar Reading	26	104.00	1.8	6	5	2	2	2	0	5.4	15.3	13.7
Programmed Reading	26	105.76	3.2	4	4	4	6	1	3	5.0	14.6	13.5
Control	25	108.36	2.3	7	7	3	1	3	0	5.0	15.8	14.1
Control	25	104.25	3.4	3	5	3	6	2	3	4.7	14.3	13.5
Programmed Reading	25	106.28	2.8	5	5	8	0	3	1	5.5	15.0	13.6
Total Population	303	105.43	2.6	71	69	48	27	23	12	5.0	14.7	13.6

data show that most of the fathers' occupational ratings are in the higher categories, thus indicating that the subjects are largely from the middle or upper middle-class backgrounds. Analysis of the fathers' education reveals that the average educational level of fathers was 14.7; for mothers, the figure was slightly lower at 13.6. This is considerably higher than the figures for disadvantaged parents' educational level, as reported by Di Lorenzo et al., (1969). The average educational level for disadvantaged fathers in that study was 10.6 and for the mothers, 11.0.

Pre-test IQ scores show that the mean for all subjects was 105.43. This is very close to the mean IQ for all of the East Brunswick elementary school pupil s.

The subjects were partially randomly assigned by sex to the twelve kindergarten classes in the experiment using a table of random numbers from Fisher and Yates (1957). One-half of the subjects were assigned to control classes and the other half to experimental classes.

The children ranged in age from four years-ten months to six years-three months at the time of the pre-testing. The distribution by sex was 159 boys and 144 girls, as shown in Table 3. There was a total of 153 subjects in the experimental classes and a total of 150 in the control classes.

Table 3
Distribution of Subjects by Sex

	Boys	Girls	Total
Experimental	79	74	153
Control	80	70	150
Total	159	144	303

Due to attrition, the total number of subjects remaining in the study after post-testing was 297. Six subjects were dropped from the study, three boys and three girls. Of the six subjects dropped from the study, four had moved out of the school district and two had missed the IQ test.

The Teachers

The teachers were randomly assigned to the four treatment groups. Each teacher taught an experimental class and a control class as shown in Table 1 in the Introduction, thus providing a partial control of the teacher variable.

The background of each teacher was obtained from personal interviews which provided the data for Table 4. This table also shows which experimental treatment each teacher taught.

The teachers ranged in age from 26 to 58. Teaching experience ranged from three years experience to sixteen. It is interesting to note that there were three teachers who had taught in the grades above kindergarten, while three teachers had only taught in kindergarten or nursery school.

Table 4

Background of Teachers

	Distar Language		Distar Reading		Programmed Reading	
Teachers	1	2	3	4	5	6
Age	40	37	42	26	58	27
College Education	B.S.	Ed. M.	B.A. +40	B.A.	Ed. M.	B.S. +B.A.
Teaching Experience in Years	13	16	4	3	16	6
Grades Taught	K-2	K-7	K	N-K	K-12	K
Married (M) Single (S)	M	S	M	M	M	M

Some indication of how the teachers reacted to the experimental programs was obtained by a Teacher Questionnaire completed at the end of the study. The questions and the teachers' responses are shown below:

Question 1. How did you feel about teaching in the experimental program in November?

Teachers' attitudes were somewhat mixed at the beginning of the experiment. Most of the teachers were anxious to try teaching with a structured program. One teacher expressed her dissatisfaction with being assigned to teach a method without having any choice in the matter.

Question 2. How do you feel about the program as compared to your feelings during the first few weeks?

The teachers generally expressed their satisfaction with the programs except for a few who felt the Distar programs were too repetitive and tedious to teach to two groups.

Question 3. Was the experimental program effective in your opinion?

All of the teachers indicated that the experimental programs were effective.

Question 4. Were the children able to learn most of the skills and concepts presented in the experimental program?

All of the teachers indicated that most of the children were able to learn the skills and concepts being taught.

Question 5. How many children had difficulty learning the experimental material?

Most of the teachers indicated that only a few children had difficulty learning the experimental material.

Question 6. Do you prefer structured, formal instruction for teaching skill subjects or do you prefer an informal, activities-centered type of program for kindergarten?

One half of the teachers expressed a preference for teaching structured programs, while the other half expressed a preference for more individualized instruction.

Question 7. How many children, in your opinion, lacked the maturity to benefit from structured learning activities?

The responses to this question are shown in Table 5.

Table 5

Teachers' Opinions of Number of Children Who Lacked Maturity to benefit From Structured Instruction

Teacher	1	2	3	4	5	6	Totals
No. in Experimental Classes	6	0	12	5	2	6	31
No. in Control Classes	8	0	12	5	2	6	33

It is interesting to note that an average of only five children in each class were considered to be too immature to benefit from structural instruction. Also, there was an even distribution of these children between the experimental and control classes, which indicates the effectiveness of the randomization of the subjects.

The Treatments

Four treatment groups were set up covering four programs of instruction for the kindergarten pupils:

1. The "direct verbal" instruction language program: Distar Language.
2. The "direct verbal" instruction reading program: Distar Reading.
3. The "programmed" reading program: Programmed Reading.

4. The "traditional" kindergarten program in the control classes.

A description of each of the four programs follows:

Treatment 1, Distar Language. Two kindergarten classes, n=48, received instruction in oral language skills and concept development, using the S.R.A. Distar Language program for a period of approximately 24 minutes each school day. During the first four months of instruction, the Distar Language program was taught to the entire class at one time in both of the experimental classrooms. It should be pointed out that the Distar program calls for giving instruction to small groups, preferably with about six to eight children in a group. When the teachers grouped the class into two groups, there were about twelve in each group. S.R.A. consultants felt that the middle-class children could benefit from the Distar program in groups of twelve children. After the first four months with this grouping arrangement, it was felt by the teachers and agreed upon by an S.R.A. representative that it would be better to give instruction to the entire class for the balance of the school year. The chief reasons for this change in grouping were: (1) it appeared that the pupils were well enough adjusted to the program to work well in large groups; (2) the pupils appeared to learn the lessons with great ease, thus lessening the need for intensive pupil-teacher interaction; and (3) the material became boring at times because of its repetitive nature; when it was being taught in two groupings, the boredom was compounded since one group could overhear the other group.

The Distar Language program was originally designed to give "disadvantaged" children a chance to succeed in school by providing essential basic skills at an accelerated pace. No basic skills are assumed and the emphasis is upon teaching rather than supposing the skills to be already achieved. Thus, the program is designed to teach basic language concepts to children who, for whatever reason, have not yet acquired them. Some of the concepts taught are the following: polar opposites, prepositions, sequencing, parts and wholes, categories, and plurals. The program is highly structured. Each concept is developed thoroughly and repeated a sufficient number of times to ensure mastery. Teachers are given specific directions on what they should say and when they should say it; what they should do and when they should do it. One of the distinguishing features of the program is the intensive verbal interaction between the teacher and the pupil. Every child is called upon frequently during a lesson to respond orally to questions and unfinished statements. The children must respond in certain ways, usually in complete sentences.

Distar Language I contains one hundred eighty lessons. One of the teachers who taught this program completed up to Lesson 112; the other teacher completed up to Lesson 115 during the six and one-half months of instruction between pre- and post-testing.

Treatment 2, Distar Reading. Two kindergarten classes, n=51, received instruction in basic reading skills, using the S.R.A. Distar Reading program for a period of approximately

25 to 30 minutes each school day. The Distar Reading program was originally designed to teach basic reading skills to young, disadvantaged children. It is paced slowly enough to provide sufficient practice in each concept to insure adequate competence before introducing a new concept. It is carefully sequenced and structured to provide a developmental program. Some of the basic skills developed are the following: directionality, auditory discrimination, rhyming, letter names, letter sounds, blending, alphabetic order, word recognition, and spelling. A distinctive feature of this program is the intensive verbal interchange between the teacher and pupils. Another distinctive feature of this program is the unusual way in which children are taught to blend sounds into words. This unique approach is described in one of the S.R.A. (1970) Distar manuals, as follows:

> The children in the Distar Reading System begin reading sounds only after they have completed work with individual sounds (rrr, mmm, aaa, eee, sss, and so forth). When they understand that each letter symbol is a signal to produce sounds, they begin work with words of only two letters (such as "am" and "me"). They learn a method of work attack that shows them how to break a word up into its component parts ('say it slowly') and then put it back together (' say it fast'). This procedure of sounding out a word and then blending the sounds together makes it possible for children to successfully attack a great number of words.

The emphasis, as indicated above, is on developing the understanding that each part of a word has a sound and that these sounds can be blended together to form words. This is a decoding approach to reading. Comprehension skills are not included in this program, as they are in the typical basal reader approach. The alphabet is controlled for consistency by using a number of i.t.a. letter symbols.

This program emphasizes positive reinforcement by requiring the teacher to praise the children very often for correct response. "Take homes" are also provided for additional positive reinforcement. These are small slips of paper which contain words, sentences or short stories relating to the particular lesson. They are given to each child at the end of a lesson as reward for work well done. However, in order to make sure the "take homes" did not get into the hands of any of the control children, they were not sent home with the child as the program calls for. Instead, the children worked on the "take homes" in the classroom after each lesson and handed them back to the teacher. This may have had some watering down effect on the total effectiveness of the program.

The complete Distar Reading I program includes one hundred and sixty lessons. One of the teachers who taught this program completed up to Lesson 97 and the other teacher completed up to Lesson 100 during the six and one-half months of instruction between pre- and post-testing. Instruction was given to one-half of a class at a time in each of the experimental classes, thus requiring each teacher to present the same material twice each day. This met the requirement of the Distar program for small group instruction.

Treatment 3, Programmed Reading. Two kindergarten classes, n=51, received instruction in reading, writing and spelling using the Sullivan Programmed Reading program for a period of approximately forty minutes each school day. This program combines a phonic and linquistic approach, together

with a correlated language arts approach. The material is paced slowly enough to insure competence in each concept before new concepts are introduced. Reading, writing, and spelling skills are coordinated to provide maximum reinforcement. The vocabulary is controlled for phoneme-grapheme consistency, thus enabling the pupil to develop independence in word recognition.

The program is highly structured and carefully sequenced. After developing a degree of independence in word recognition skills, the programmed phase is introduced. The programming provides for instant feedback, self-correction, and enables the pupils to work at their own pace.

The program is divided into three stages. In stage one, the teacher provides instruction without the use of pupil textbooks, developing such readiness skills as:

1. Knowledge of letter names and how to print them. Only six letters are taught during this stage: a, i, n, p, t, m.

2. Spelling words orally, using the six letters already taught.

3. Knowledge of the sounds of the six letters and how to blend letters into words.

The second stage includes the use of the Prereader, a pupil workbook. During this stage, the pupils learn such skills as:

1. Writing words, using the six letters already learned.

2. The name and short vowel sound of the letter O.

3. The words I, a, yes and no.

4. Concept of a written sentence.

5. Reading and writing sentences.

6. Choosing correct answers to questions.

The third stage is the beginning of the programmed instructional phase. The pupils are taught how to use the text-work-books so that they can eventually proceed on their own at their own pace. This is possible because the answers to all required responses are printed along a column on one side of each page. This provides instant feedback, thus reinforcing correct responses.

The test-workbook includes:

1. Statements or questions to which the pupil responds by circling a choice of given answers.

2. Incomplete sentences to which the pupil must circle a choice of words for completion of the sentence.

3. Incomplete words to which the pupil must write in the missing letter.

4. Missing words to which the pupil must write in the missing word.

This stage of the program begins with Book One and continues through Book Twenty-one. Each book gets progressively more difficult by gradually increasing the length and complexity of sentences; then introducing paragraphs and finally long stories. In this study, all of the experimental subjects assigned to this treatment completed Book Two by the time the post-testing began. By the end of Book Two, the children had been taught 129 words; only two of which were irregular sight words.

In both of the experimental classes, the teachers taught the Programmed Reading material to the entire class during each lesson. Neither teacher permitted the children to work at their own pace, but instead kept every child at the same place in the text-workbooks throughout the instructional period. Extra help was provided for slow learners by the teachers during free play periods. Also, during the workbook lessons, brighter pupils were assigned to help the slow pupils.

Treatment 4, Traditional Kindergarten (Control Groups). Six kindergarten classes, n=150, received the informal readiness activities of the regular East Brunswick kindergarten program. The program is described as traditional because it is largely based on an informal, unstructured approach with the emphasis upon socialization and readiness activities.

Although the program is largely informal, there is, in fact, a very rich language program. The language program is built around units such as: The Farm, Pets, The Policeman, The Fireman, Holidays, etc.. Each unit lasts about two weeks. Typical language activities are as follows: dramatics, show and tell, role-playing, discussions, stories, poems, experience charts, and singing. All of the teachers read a story to the children for a period of approximately 15 minutes each school day, which was often followed by a short discussion of the story.

Reading readiness skills such as experience charts, and instruction in letter names and sounds were taught on a regular basis. Children were encouraged to make lists of words from pictures associated with beginning letters. Alphabet picture books were assembled with

pictures representing words that begin with a particular letter. Children were encouraged to help the teacher write experience charts. The children then learned to read the chart. The combined reading readiness activities comprised approximately one-half hour of instruction daily.

The Peabody Kit and the Harper & Row Treasure Chest were used to supplement the language program. The Peabody Kit provides large pictures which are used to develop discussion for enlarging vocabulary, developing concepts and classification skills. The Treasure Chest contains wall charts, poetry cards, story cards, and pictures which relate to typical units at the kindergarten level. These materials provided for such activities as: informal discussions, question and answer sessions, sequencing, and dramatization.

Measures and Test Instruments

The Kuhlman-Anderson Test (KAT), Booklet K. This test provides for the assessment of general mental ability. It is highly verbal. It provides an overall mental age and intelligence quotient. Booklet K is standardized on kindergarten norms.

The Stanford Early School Achievement Test - Level I (SESAT-I). This is a battery of five subtests which measure: meaning of words, letters and sounds, mathematics, and aural comprehension. Percentile and stanine scores are provided. Level I is standardized on kindergarten norms.

The Stanford Early School Achievement Test - Level II (SESAT-II). This is a battery of six subtests which measure: meaning of words, letters and sounds, word reading, sentence reading, mathematics, and aural comprehension. Level II is standardized for the first grade.

The word reading subtest of this battery was used to measure the effects of the reading programs.

The Wide Range Achievement Test (WRAT). There are three subtests which measure: reading, spelling, and arithmetic. It yields grade equivalent scores as low as pre-kindergarten. The reading and arithmetic subtests require individual administration at the kindergarten level.

The Child Behavior Rating Scale (CBRS). This rating scale was developed by Dr. Russell Cassel. It has been standardized and tested for reliability and validity. The social and school adjustment sections were used to assess the school adjustment of the subjects.

Testing Procedures

During the last two weeks of October all of the subjects were pre-tested with the Kuhlmann-Anderson Intelligence Test (KAT) and the Stanford Early School Achievement Test - Level I (SESAT-I). The Wide Range Achievement Test (WRAT) was administered to 100 subjects on a one-to-one basis. Time did not permit the administration of the WRAT to all subjects during pre-testing. The Social Adjustment and School Adjustment subtests of the Child Behavior Rating Scale were completed during Decemb er for all subjects.

During the last two weeks of May all of the subjects were post-tested with all of the tests mentioned above. In addition, the Word Reading subtest of the Stanford Early School Achievement Test - Level II was administered to all subjects as a post-test.

All of the group tests were administered by the classroom teachers. The Wide Range Reading subtest was administered on an individidual basis by two competent examiners to all of the

subjects during post-testing. All of the tests were hand-scored. Each test booklet was double-checked at least twice to eliminate any possible errors in scoring.

During the two weeks prior to pre-testing, two practice sessions were given to all subjects on sample pages from the test booklets to prepare the subjects for the testing situation. During the testing periods, arrangements were made for additional testing days to provide for those children who were absent on regularly scheduled test days. This arrangement made it possible to secure complete data on all but a few of the subjects. Seven pupils missed taking the SESAT-I pre-test, and two pupils missed the KAT IQ test.

Statistical Analysis

The raw data on the 28 variables for the entire group of 297 pupils were keypunched on IBM cards and processed through the Center for Computer and Information Services (CCIS) located at Rutgers - the State University, New Brunswick, New Jersey. The data were computed on the IBM Computer 360/67.

The BMDO3D, "Correlation with Item Deletion" program was used to obtain means and standard deviations for each of the pre- and post-test variables. This program also supplied a correlation matrix for all of the variables.

The BMDX64, "General Linear Hypothesis" program was then applied to nine major variables to obtain an analysis of covariance on each of the major variables. The major variables are as follows: IQ; SESAT-I, Environment; SESAT-I, Letters and Sounds; SESAT-I, Total; WRAT, Reading; WRAT, Spelling; CBRS, Social Adjustment; CBRS, School Adjustment; and SESAT-II, Word Reading.

Pre-test scores were used as covariates and post-test scores as the response (dependent) variables in computing the analysis of covariance. Three experimental factors were considered. The first factor was the method of treatment. Two levels of this factor were considered, the experimental (structured) methods and the control (unstructured) method. Another factor was the teacher. The two levels were one teacher as compared with another teacher. The third factor was sex, in which the two levels compared were boys and girls. The factor of time of day was not included in the analysis since the computer programs available at CCIS could not include this factor according to the design of this study.

CHAPTER III

Findings: End of Kindergarten

This chapter presents an analysis of the experimental data and a description of the findings at the end of the kindergarten year. Statistical analyses were used to test the experimental hypotheses.

The data were computed to obtain means and standard deviations for each pre- and post-subtest and total battery scores. The data for the means and standard deviations of six major variables are shown for the three experimental treatments and their controls on Tables 6, 7 & 8 in Appendix II. An analysis of covariance was carried out to find adjusted mean differences and F-ratios. By using an F distribution table (Mood and Graybill, 1963, p. 435), it was possible to determine which differences were significant.

The findings for each of the hypotheses are presented below.

Hypothesis 1

Middle-class children taught with a "direct verbal" instruction language program in kindergarten will achieve significantly higher scores on achievement tests and IQ tests than will middle-class children in the traditional kindergarten.

To test this hypothesis, pre-tests were administered prior to the beginning of instruction. Two experimental classes, n=49, received instruction with the Distar Language program for a period of approximately 25 minutes each school day. Two experimental classes, n=49, received the traditional kindergarten language

program for a period of approximately 30 minutes each school day. After six and one-half months of instruction, post-tests were administered. Pre- and post-tests were subjected to statistical analysis and provided the following results:

Effect of language treatments on achievement. By comparing the effects of the Distar Language program and its control (traditional kindergarten language program) on achievement, two significant differences were found. One significant difference favored the experimental group on the Environment subtest of the SESAT-I battery. The other significant difference favored the control group on the Reading subtest of the Wide Range Achievement Test. The results are described below:

The scores of the SESAT-I Environment subtest were subjected to an analysis of covariance using pre-I_Q and pre-subtest scores as covariates. There were six pupils who missed taking the SESAT-I battery pre-test. Their data were not included in the analysis. The results showed an adjusted mean difference of 1.88 as shown in Table 9. The analysis of covariance also showed that the main effect of treatment had an F-ratio of 11.53 which is significant beyond the .01 level. The complete results of the analysis of covariances are shown in Table 10. The data support the finding that the Distar Language program produced superior results on a language subtest (SESAT-I Environment) when compared with the control group.

Table 9

Comparison of Adjusted Means on the SESAT-I Environment Subetst by Trestments (Distar Language and Control)

	Experimental	Control
Number	46	46
Adjusted Mean	37.64	35.96
Difference	1.88	

Table 10

Analysis of Covariance of Effect of Treatments (Distar Language and Control) on SESAT-I Environment Subtest Scores

Sources of Variance	Degrees of Freedom	Mean Square	F
Experimental-Control	1	94.15	11.53***
Teacher	1	2.10	0.26
Sex	1	4.72	0.58
Exp.-Con.X Teacher	1	12.80	1.57
Exp.-Con.X Sex	1	5.66	0.69
Sex X Teacher	1	13.65	1.67
Exp.-Con.X Te.X Sex	1	0.92	0.11
Within subclasses	88	8.16	----

*** Significant beyond the .01 level

The score of the Wide Range Reading subtest were subjected to analysis of covariance, using pre-IQ and pre-subtest scores as covariates. The results of this analysis showed an adjusted mean difference of 2.24, as shown in Table II. The analysis of covariance also showed that the treatment effect had an F-ratio of 3.09, which is significant beyond the .10 level. In this analysis the sex by treatment interaction showed an F-ratio of 4.36 which is significant at the .05 level, as shown in Table 12. The data support the finding that the control group (traditional kindergarten) produced significantly higher scores on the Wide Range Reading Test as compared to the experimental group.

Table 11

Comparison of Adjusted Means on the Wide Range Reading Tests by Treatments (Distar Language and Control)

	Experimental	Control
Number	49	49
Adjusted Mean	103.38	105.62
Difference	2.24	

Table 12

Analysis of Covariance of Effect of Treatments (Distar Language and Control) on WRAT Reading Scores

Sources of Variance	Degrees of Freedom	Mean Square	F
Experimental-Control	1	120.58	3.09*
Teacher	1	19.14	0.49
Sex	1	125.11	3.20*
Exp.-Con.X Teacher	1	3.98	0.10
Exp.-Con.X Sex	1	170.11	4.36**
Sex X Teacher	1	259.77	6.65**
Exp.-Con.X Te.X Sex	1	78.82	2.02
Within subclasses	89	39.05	---

* Significant beyond the .10 level.
**Significant beyond the .05 level.

The findings described above indicate that the Distar Language program met the hypothesis criteria for achievement on only one of the variables tested; namely, the Environment subtest of SESAT-I. It is interesting to note that middle-class kindergarten children achieved significant improvement on this subtest which measured knowledge of words in the environment. This may indicate a need for more structured instruction in this area.

The fact that the control classes did significantly better on the WRAT reading test than the experimental group may be due to the shorter time period allowed for reading instruction in the experimental classes. This situation was due to the fact that the experimental classes conducted a double session of Language instruction, since the program required small group instruction. It should also be pointed out that the scores on the Wide Range Reading Test were much higher for the experimental classes which received structured programs of reading instruction than any of the control classes, as shown in Table 13.

Table 13

A Comparison of the Effect of Structured and Non-structured Programs of Instruction on the Wide Range Reading Test.

	Distar Language			
	exp.	con.	exp.	con.
N	24	24	25	25
Post-Test Mean Score	102.08	105.79	103.96	106.12
Difference	1.92		1.56	
Adjusted Mean Difference	2.36			

	Distar Reading			
	exp.	con.	exp.	con.
N	25	24	26	25
Post-Test Mean Score	113.84	104.72	106.73	103.92
Difference	9.12		2.81	
Adjusted Mean Difference	5.48			

	Programmed Reading			
	exp.	con.	exp.	con.
N	25	25	25	24
Post-Test Mean Score	111.80	102.80	113.16	104.79
Difference	9.00		8.37	
Adjusted Mean Difference	8.84			

Effect of language treatments on IQ. Initial testing showed an IQ mean of 105.06 for the experimental group with a range of 77 to 138. The control group's initial IQ mean was 106.22 with a range of 80 to 138. At the termination of the program, the experimental group's IQ mean had increased to 123.51, a gain of 18.45 points, while the control group's mean had increased to 119.98, a gain of 13.76 points. There was a difference of 4.69 points between the experimental and control groups in favor of the experimental group, as shown in Table 14.

The data were then subjected to an analysis of covariance, using pre-test IQ and initial chronological age as covariates. The results of this analysis showed an adjusted mean difference of 4.03, as shown in Table 15. The analysis of covariance also showed that the main effect of treatment had an F-ratio of 3.16, which is significant beyond the .10 level. The complete results of the analysis of covariance are shown in Table 16.

The results of the IQ testing show a substantial increase in IQ scores for both the control and experimental groups with significantly higher scores shown for the experimental group. This evidence supports the hypothesis that structured language instruction, with an emphasis on concept development, does have a beneficial effect on IQ growth for middle class children.

Table 14

Comparison of Unadjusted Means on the Kuhlmann-Anderson IQ Test by Treatments (Distar Language and Control)

	Experimental	Control
Number	49	49
Pre-Test Mean	105.06	106.22
Post-Test Mean	123.51	119.98
Change	18.45	13.76
Difference	4.69	

Table 15

Comparison of Adjusted Means on the Kuhlmann-Anderson IQ Tests by Treatments (Distar Language and Control)

	Experimental	Control
Number	49	49
Adjusted Mean	123.75	119.72
Difference	4.03	

Table 16

Analysis of Covariance of Effect of Treatments (Distar Language and Control) on KAT IQ Scores

Sources of Variance	Degrees of Freedom	Mean Square	F
Experimental Control	1	357.42	3.16*
Teacher	1	0.74	0.01
Sex	1	185.89	1.64
Exp.-Con.X Teacher	1	33.42	0.29
Exp.-Con.X Sex	1	10.27	0.09
Sex X Teacher	1	38.58	0.34
Exp.-Con.X Te. X Sex	1	0.60	0.01
Within subclasses	88	113.12	---

*Significant beyond the .10 level.

Not only did the Distar Language program affect IQ growth, but the programmed Reading program produced substantial IQ gains as well. Analysis of covariance was used to test for significance. The main effect of the treatment had an F-ratio of 12.38, which is significant beyond the .01 level. There was a treatment and teacher interaction that produced an F-ratio of 5.31 which is significant at the .05 level. The complete results of the analysis of covariance are shown in Table 17. An indication of how each of the experimental programs and their controls affected the IQ scores is shown on Table 18.

Table 17

Analysis of Covariance of Effect of Treatments (Programmed Reading and Control) on KAT IQ Scores

Sources of Variance	Degrees of Freedom	Mean Square	F
Experimental-Control	1	1595.65	12.38***
Teacher	1	68.31	0.53
Sex	1	90.42	0.70
Exp.-Con. X Teacher	1	684.87	5.31**
Exp.-Con. X Sex	1	295.17	2.29
Sex X Teacher	1	0.00	0.00
Exp.-Con. X Te. X Sex	1	44.19	0.34
Within Subclasses	89	128.89	----

***Significant beyond the .01 level
**Significant beyond the .05 level

Table 18

Comparison of the Effect of Structured and Non-structured Programs of Instruction on KAT IQ Means

	Distar Language			
	Teacher 1		Teacher 2	
	exp.	con.	exp.	con.
N	24	24	25	25
Pre-Test Mean Score	104.83	105.54	105.28	106.88
Post-Test Mean Score	122.92	120.13	124.08	119.84
Change	18.12	14.59	18.80	12.96
Difference	3.53		5.84	
Adjusted Mean Difference	4.03			

	Distar Reading			
	Teacher 3		Teacher 4	
	exp.	con.	exp.	con.
N	25	24	26	25
Pre-Test Mean Score	102.96	104.13	104.00	106.92
Post-Test Mean Score	119.36	109.71	110.15	117.84
Change	16.40	5.58	6.15	10.92
Difference	10.82		4.97	
Adjusted Mean Difference	2.98			

Table 18 (cont)

	Programmed Reading			
	Teacher 5		Teacher 6	
	exp.	con.	exp.	con.
N	25	25	25	24
Pre-Test Mean Score	105.76	108.36	104.25	106.28
Post-Test Mean Score	128.52	117.16	121.88	117.46
Change	22.76	8.80	17.63	11.18
Difference	13.96		5.95	
Adjusted Mean Difference	8.13			

Hypothesis 2

Middle-class children taught with a "direct verbal" instruction reading program in kindergarten will achieve significantly higher scores on reading and spelling achievement tests than will middle-class children in the traditional kindergarten program and in all other treatment groups.

To test this hypothesis two experimental classes, n=51, received instruction with the Distar Reading program, while two control classes, n=49, received instruction with the traditional reading readiness program. The KAT and SESAT-I tests were administered to all subjects as pre- and post-tests. In addition, the WRAT Reading and Spelling tests plus the SESAT-II Word Reading Test were administered as post-tests. The test scores were subjected to statistical analysis with the following results:

Effect of treatment (Distar Reading and Control) on reading achievement tests. Significant differences favoring the experimental group were found on both of the reading achievement tests. The scores on the Wide Range Reading Test were subjected to an analysis of covariance. Pre-IQ test scores were used as the covariate.

The results showed an adjusted mean difference of 5.48 in favor of the experimental group as shown in Table 19. The analysis of covariance also showed that the main effect of treatment had an F-ratio of 14.34, which is significant beyond the .01 level. The complete results of the analysis of covariance are shown in Table 20.

Table 19

Comparison of Adjusted Means on the Wide Range Reading Test by Treatments (Distar Reading and Control)

	Experimental	Control
Number	51	49
Adjusted Mean	110.19	104.71
Difference	5.48	

Table 20

Analysis of Covariance of Effect of Treatments (Distar Reading and Control) on WRAT Reading Scores

Sources of Variance	Degrees of Freedom	Mean Square	F
Experimental-Control	1	1042.50	14.34***
Teacher	1	723.56	9.95***
Sex	1	53.71	0.74
Exp.-Con. X Teacher	1	110.90	1.53
Exp.-Con. X Sex	1	14.26	0.20
Sex X Teacher	1	5.07	0.07
Exp.-Con. X Te. X Sex	1	47.12	0.65
Within subclasses	91	72.70	---

***Significant beyond .01 level.

The scores on the SESAT-II Word Reading subtest were subjected to an analysis of covariance. Pre-IQ test scores were used as the covariate. The analysis of covariance showed that the main effect of treatment had an F-ratio of 23.18, which is significant

beyond the .01 level. There was an interaction between teachers and treatments which resulted in an F-ratio of 36.91 which is significant beyond the .01 level. The complete results of the analysis of covariance are shown in Table 21.

Table 21

Analysis of Covariance of Effect of Treatments (Distar Reading and Control) on SESAT-II Word Reading Scores

Sources of Variance	Degrees of Freedom	Mean Square	F
Experimental-Control	1	1675.88	23.18***
Teacher	1	33.13	0.46
Sex	1	9.92	0.14
Exp.-Con. X Teacher	1	2668.16	36.91***
Exp.-Con. X Sex	1	10.04	0.14
Sex X Teacher	1	158.86	2.34
Exp.-Con. X Te. X Sex	1	28.14	0.39
Within subclasses	91	72.29	---

***Significant beyond the .01 level.

Table 22 shows the adjusted mean scores by teachers and treatments, showing how the teacher-treatment interaction came about. It appears that Teacher 4 interacted with the treatments to bring about an adjusted mean difference of 2.43 in favor of her control class. On the other hand, Teacher 3 interacted with the treatments to bring about an adjusted mean difference of 18.54 in favor of her experimental class. When the combined experimental classes were compared with the combined control classes, there was a mean difference of 7.85 in favor of the experimental group as shown in Table 23.

Table 22

Comparison of Adjusted Means on SESAT-II Word Reading Subtest by Teachers and Treatments (Distar Reading and Control)

	Teacher 3		Teacher 4	
	exp.	con.	exp.	con.
N	25	24	26	25
Adjusted Mean	33.61	15.07	22.01	24.44
Difference	18.54		2.43	

Table 23

Comparison of Adjusted Means on SESAT-II Word Reading by Treatments (Distar Reading and Control)

	Experimental	Control
Number	51	49
Adjusted Mean	27.70	19.85
Difference	7.85	

It appears from the data described above that there is sufficient evidence to support the hypothesis that middle-class children taught with the "direct verbal" reading program will achieve significantly higher scores on reading achievement tests than will middle-class children in the traditional kindergarten reading readiness program. However, this evidence also indicates that not all teachers can be expected to be effective with this program.

Effect of treatments (Distar Reading and Control) on spelling achievement tests. Hypothesis 2 also included the statement that the "direct verbal" reading program would produce significantly higher reading and spelling achievement test scores than any other treatment group. This hypothesis is not supported by the evidence.

Table 18 shows the effects of the three experimental programs on the WRAT Reading Test. Table 24 shows the effects of the three experimental programs on the SESAT-II Word Reading subtest and Table 25 shows the effects of the three experimental programs on the WRAT Spelling Test. The only treatment group which achieved significantly higher scores on the spelling achievement test was the Programmed Reading Experimental group.

Hypothesis 3

Middle-class children taught with a "programmed reading" program will achieve significantly higher scores on reading and spel ling achievement tests than will middle-class children in the traditional kindergarten program.

To test this hypothesis, two experimental classes, n=50, received instruction with the Sullivan Programmed Reading program, while two control classes, n=49, received instruction with the traditional reading readiness program. The KAT and SESAT-I tests were administered to all subject as pre- and post-tests. In addition, the WRAT Reading and Spelling tests plus the SESAT-II Word Reading subtest were administered as post-tests. The test scores were subjected to statistical analysis with the following results:

Effect of treatments (Programmed Reading and Control) on reading achievement tests. Significant differences favoring the experimental group were found on both of the reading achievement tests. The scores on the Wide Range Reading Test were subjected to the analysis of covariance. Pre-IQ test scores were used as the covariate. The results showed an adjusted mean difference of 8.84 in favor of the experimental group, as shown in Table 26.

Table 24

A Comparison of the Effects of Structured and Unstructured Programs of Instruction on SESAT-II Word Reading Subtest Means

Distar Language

Score	PM exp.	AM con.	PM con.	AM exp.
N	24	24	25	25
Class	1	2	3	4
Post-Test X	29.09	26.25	25.56	25.00
Difference	2.84		0.56	
Adjusted Mean Difference	0.52			

Distar Reading

Score	PM exp.	AM con.	PM con.	AM exp.
N	25	24	25	26
Class	5	6	7	8
Post-Test X	33.00	15.12	25.40	21.81
Difference	17.88		3.59	
Adjusted Mean Difference	7.85			

Programmed Reading

Score	PM exp.	AM con.	PM con.	AM exp.
N	25	25	24	25
Class	9	10	11	12
Post-Test X	35.28	21.72	28.74	33.28
Difference	13.56		4.54	
Adjusted Mean Difference	9.81			

Table 25

A Comparison of the Effect of Structured and Non-Structured Programs of Instruction on Wide Range Spelling Test Means

	Distar Language			
	exp.	con.	exp.	con.
N	24	24	25	25
Post-Test Mean Score	95.42	94.58	97.81	99.44
Difference	0.84		1.63	
Adjusted Mean Difference	0.05			

	Distar Reading			
	exp.	con.	exp.	con.
N	25	24	26	25
Post-Test Mean Score	103.04	96.92	95.19	101.40
Difference	6.12		6.21	
Adjusted Mean Difference	0.92			

	Programmed Reading			
	exp.	con.	exp.	con.
N	25	25	25	24
Post-Test Mean Score	106.56	99.64	106.20	99.21
Difference	6.92		6.99	
Adjusted Mean Difference	7.07			

The analysis of covariance also showed that the main effect of treatment had an F-ratio of 24.52 which is significant beyond the .01 level. The complete results of the analysis of covariance are shown in Table 27.

The scores on the SESAT-II Word Reading subtest were subjected to the analysis of covariance. Pre-IQ test scores were used as a covariate. The results showed an adjusted mean difference of 9.81 in favor of the experimental group, as shown in Table 28. The analysis of covariance also showed that the main effect of treatment had an F-ratio of 20.38 which is significant beyond the .01 level. There was an interaction between teachers and treatments which resulted in an F-ratio of 6.46, significant at the .05 level. The complete results of the analysis of covariance are shown in Table 29. The effects of each of the three experimental treatments and their controls on the SESAT-II Word Reading subtest are shown in Table 24.

Table 26

Comparison of Adjusted Means on the Wide Range Reading Test by Treatments (Programmed Reading and Control)

	Experimental	Control
Number	50	49
Adjusted Mean	112.55	103.71
Difference	8.84	

Table 27

Analysis of Covariance of Effect of Treatments (Programmed Reading and Control) on WRAT Reading Scores

Sources of Variance	Degrees of Freedom	Mean Square	F
Experimental-Control	1	1888.87	24.52***
Teacher	1	156.81	2.03
Sex	1	8.46	0.11
Exp.-Con. X Teacher	1	52.16	0.68
Exp.-Con. X Sex	1	5.57	0.07
Sex X Teacher	1	91.02	1.18
Exp.-Con. X Te. X Sex	1	2.37	0.03
Within subclasses	90	77.04	---

***Significant beyond the .01 level

Table 28

Comparison of Adjusted Means on the SESAT-II Word Reading Subtest by Treatments (Distar Language and Control)

	Experimental	Control
Number	50	49
Adjusted Mean	34.33	24.52
Difference	9.81	

Table 29

Analysis of Covariance of Effect of Treatments (Programmed Reading and Control) on SESAT-II Word Reading Scores

Sources of Variance	Degrees of Freedom	Mean Square	F
Experimental-Control	1	1958.47	20.38***
Teacher	1	200.82	2.09
Sex	1	343.11	3.57*
Exp.-Con. X Teacher	1	620.93	6.46**
Exp.-Con X Sex	1	46.44	0.48
Sex X Teacher	1	66.48	0.69
Exp.-Con. X Te. X Sex	1	14.95	0.16
Within subclasses	90	96.10	---

***Significant beyond the .01 level
** Significant beyond the .05 level
* Significant beyond the .10 level

The teacher-treatment interaction occurred because one teacher produced a higher magnitude of difference between her experimental and control classes than did the other teacher, as shown in Table 30. Figure 1 illustrates graphically how the teacher-treatment interaction appears.

Table 30

Comparison of Adjusted Means on SESAT-II Word Reading by Treatments (Programmed Reading and Control) showing Teacher-Treatment Interaction.

	Teacher 5		Teacher 6	
	Exp.	Con.	Exp.	Con.
N	25	25	25	26
Adjusted Mean	35.40	21.08	33.25	28.11
Difference	14.32		5.14	

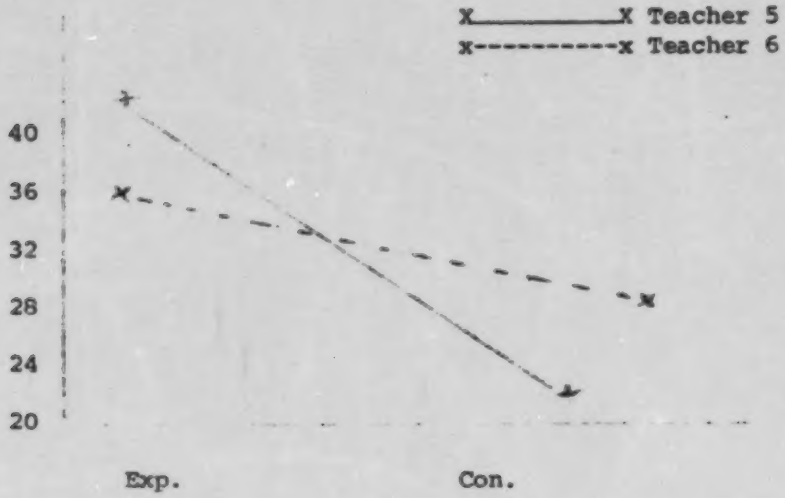

Fig. 1 Teacher-treatment interaction on the SESAT-II Word Reading Subject

Effect of treatment (Programmed Reading and Control) on spelling achievement tests. Significant differences favoring the experimental group were found on the Wide Range Spelling Test. The analysis of covariance was used to obtain adjusted means. Comparison of the adjusted means showed an adjusted mean difference of 7.07 in favor of the experimental group, as shown in Table 31. The analysis of covariance also showed that the main effect of treatment had an F-ratio of 13.20 which is significant beyond the .01 level. The complete results of the analysis of covariance are shown in Table 32.

Table 31

Comparison of Adjusted Means on the Wide Range Spelling Test by Treatments (Programmed Reading and Control)

	Experimental	Control
N	50	49
Adjusted Mean	106.44	99.37
Difference	7.07	

It appears from the data described above that there is sufficient evidence to support Hypothesis 3. The experimental group did achieve significantly higher scores than the control group on both reading and spelling achievement tests.

Table 32

Analysis of Covariance of Effect of Treatments (Programmed Reading and Control) on WRAT Spelling Scores

Sources of Variance	Degrees of Freedom	Mean Square	F
Experimental-Control	1	1259.47	13.20***
Teacher	1	3.43	0.04
Sex	1	13.91	0.15
Exp.-Con. X Teacher	1	22.67	0.24
Exp.-Con. X Sex	1	0.13	0.00
Sex X Teacher	1	65.29	0.68
Exp.-Con. X Te. X Sex	1	4.25	0.04
Within subclasses	90	95.45	----

***Significant beyond the .01 level

Hypotheses 4

The children in the experimental instruction programs will be better adjusted to school than the children in the traditional kindergarten program as measured by a standardized behavior rating scale.

To test this hypothesis every pupil was rated on the social and school adjustment sections of the Child Behavior Rating Scale by the classroom teachers. Initial and final ratings were administered. The scores on the rating scale were subjected to statistical analysis. The analysis of covariance was used to determine whether any significant differences occurred as the result of the different treatments. Pre-IQ and initial rating test scores were used as covariates.

No significant differences were found on either the CBRS Social Adjustment Test or the CBRS School Adjustment Test among any of the treatment groups. The hypothesis, therefore, is not supported by the evidence. However, the evidence indicates that there were no adverse effects on the pupils as the result of any of the treatments.

Mental Age and Beginning Reading.

A widespread belief exists that young children cannot succeed in learning to read unless they have a mental age of at least six years-six months. Initial testing with the Kuhlmann-Anderson Test provided mental age scores for all subjects. The average mental age for all subjects was five years-eight months. The average mental age for the 101 pupils in the experimental reading program was five years-seven months. Of these only ten had a mental age of six years-six months or higher.

Final testing with the WRAT and SESAT-II reading achievement tests indicated that substantial progress in learning to read had been made by the pupils who were in the experimental reading groups. Since most of the pupils had mental ages well below six years-six months, there is good reason to doubt the value of delaying reading instruction on the basis of a mental age requirement of six years-six months.

The Sex Factor and Success in Reading.

Although the factor of sex was not included in the hypothesis, it was provided for in the design of the study. As indicated before, the subjects were partially randomly assigned by sex, thus providing for an equal distribution of boys and girls among the different treatment groups.

From an analysis of the data it appeared that there were no significant sex by treatment interactions except in one case. The sex interaction appeared in the comparison of the effects of the Distar Language program and its controls on reading achievement. On the analysis, as shown in Table 12, there was a significant interaction between sex and treatment which produced an F-ratio of 4.36 which was significant at the .05 level. In this case, the girls did better than the boys in reading achievement as a result of the traditional reading readiness program. By contrast, there were no significant interactions with treatments in favor of the girls in either of the two experimental reading programs.

This evidence is of great interest since it contrasts with the usual finding reported in many studies that girls do better than boys in learning to read. Harris (1961) pointed out that

it is a statistical fact that boys in America Constitute about two-thirds of the milder reading disability cases and make up 75 to 90 percent of the severe cases. Harris concluded that more boys than girls are not ready for reading instruction. It has also been theorized that girls have a maturational advantage over boys.

That this situation cannot be attributed to maturational causes is indicated by the results of a study comparing reading achievement of children in Germany with children in America. It was found that just the reverse situation exists in Germany in regard to the sex factor. In Germany most of the retarded readers are girls, according to Preston (1962).

Manning (1966), on the basis of an experimental study, reached the following conclusion: "The reading skills superiority of girls (over boys)....seems more a product of inferior teaching service to boys than a maturational advantage of girls (p. 616)." Boys did as well as the girls in the experimental groups which received intensive phonics instruction, while the boys had the expected lower achievement than girls in the groups taught by the basal reader approach.

The results of this study are supported by Murphy (1964) who made the following statement:

> We have known for a long time that more boys have difficulty in learning to read..... There is a real difference between the ability of boys and girls to hear sounds in spoken words, the girls doing much better. When the boys are taught this skill, differences in achievement disappear. We should no longer expect more boys than girls to fail. We should prevent their failure (p. 148).

The above-mentioned data indicate that boys should do as well as girls in learning to read if beginning reading instruction

emphasizes certain basic phonic skills. The evidence from this study supports this hypothesis, since both of the experimental reading programs did emphasize basic phonic skills and the girls did not achieve significantly higher scores than the boys.

Summary.

The main purpose of this experimental study was to determine whether middle-class kindergarten pupils who received structured direct instruction in language and reading would achieve significantly higher IQ and achievement test scores than middle-class pupils in the traditional informal kindergarten. A number of significant differences between treatments emerged from the analysis of the data. The conclusions reached for each of the four major hypotheses are presented below. Additional conclusions drawn from the findings are also presented.

Hypothesis 1

Hypothesis 1 stated that middle-class children taught with a "direct verbal" instruction language program in kindergarten will achieve significantly higher scores on achievement tests and IQ tests than will middle-class children in the traditional kindergarten program. This hypothesis deals with two variables, IQ and achievement. Conclusions are stated separately for each variable.

This study provided sufficient evidence to substantiate the conclusion that the structured, "direct verbal"language program did have a real effect on producing superior IQ growth

as measured by the Kuhlmann-Anderson Test. The data analysis showed a significant difference beyond the .10 level in favor of the experimental group. On the basis of this evidence, the portion of Hypothesis 1 relating to IQ is accepted.

For the portion of the hypothesis which related to academic achievement as measured by the WRAT and SESAT tests, there was not sufficient evidence to either prove or disprove the hypothesis.

Hypothesis 2

Hypothesis 2 stated that middle-class children taught with a "direct verbal" instruction reading program in kindergarten will achieve significantly higher scores on reading and spelling achievement tests than will middle-class children in the traditional kindergarten program and all other treatment groups. This hypothesis includes three statements dealing with the effects of the structured "direct verbal" reading program as it relates to (1) reading achievement, (2) spelling achievement, and (3) its effectiveness as compared to each of the other treatments. Conclusions for each of these parts of the hypothesis are presented below.

There was sufficient evidence to substantiate the conclusion that the structured, "direct verbal" reading programs had a real effect on producing superior reading achievement, as measured by the WRAT test. The data analysis showed a significant difference beyond the .01 level in favor of the experimental group. On the basis of this evidence, the part of hypothesis 2 relating to reading achievement is accepted.

On the Word Reading subtest of SESAT-II there was also a significant difference beyond the .01 level in favor of the experimental group. However, on this subtest a significant teacher-treatment interaction appeared which indicates that the effectiveness of the method depends on the teacher.

For parts (2) and (3) of this hypothesis, which relate to spelling achievement and superiority of the treatment over all of the other treatments, there is not sufficient evidence to either prove or disprove these parts of the hypothesis.

Hypothesis 3

Hypothesis 3 stated that middle-class children taught with a "programmed reading" program will achieve significantly higher scores on reading and spelling achievement tests than will middle-class children in the traditional kindergarten program. This hypothesis deals with two variables, reading and spelling. Conclusions are given for each variable separately.

This study provided sufficient evidence to substantiate the conclusion that the structured, "programmed reading" program had a real effect on producing superior reading achievement, as measured by the WRAT Reading Test. The data analysis showed a significant difference beyond the .01 level in favor of the experimental group. On the basis of this evidence, the portion of Hypothesis 3 relating to reading is accepted.

On the Word Reading subtest of SESAT-II there was also a significant difference beyond the .01 level favoring the experimental group. However, there was a significant teacher-treatment interaction which indicated that one teacher was more effective than the other with this method.

This study provided sufficient evidence to substantiate the conclusion that the structured, "programmed reading" program has a real effect on producing superior spelling achievement, as measured by the WRAT Spelling Test. The data and analysis showed a significant difference beyond the .01 level in favor of the experimental group. On the basis of this evidence the part of hypothesis 3 dealing with spelling is accepted. Since both the reading and spelling variables were accepted in this hypothesis, we may conclude that hypothesis 3 is accepted in its entirety.

Hypothesis 4

This hypothesis states that the children in the experimental instruction programs will be better adjusted to school than the children in the traditional kindergarten program as measured by a standardized behavior rating scale. This hypothesis was tested by the use of two rating measures, CBRS Social Adjustment and CBRS School Adjustment. No significant differences were found between any of the treatment groups, although one of the experimental groups did approach significantly better adjustment than its control group on the CBRS Social Adjustment test, as shown by Table 33 in Appendix III. For this hypothesis there is not sufficient evidence to either prove or disprove the hypothesis.

Additional Conclusions

The data from this study provided sufficient evidence to reach tentative conclusions about two hypotheses which were not stated in the original major hypotheses of this study. One of these minor hypotheses can be stated as follows:

Middle-class kindergarten children with a mental age below six years-six months can learn to read without adverse effects. This hypothesis is supported by the evidence in this study.

The second minor hypothesis can be stated as follows: There will be no significant differences between middle-class kindergarten boys and girls on reading achievement test scores as the result of certain structured programs of reading instruction. This hypothesis is supported by the evidence in this study.

In conclusion, the data obtained at the end of the kindergarten year warranted a follow-up study of the subjects through the first grade for a more definitive assessment of the effects of the structured programs.

CHAPTER IV

Methods and Procedures

First Grade

Results of the kindergarten study showed that there were significant differences favoring the experimental groups. There was sufficient evidence to support three of the major hypotheses, as described in the previous chapter.

The kindergarten study was continued through first grade in order to determine whether there was any permanency to the effects of the experimental treatments. This chapter describes the methods and procedures used in the first grade to test the four major hypotheses. The hypotheses have been restated for the first grade study as follows:

The First Grade Hypotheses

Hypothesis 1. Middle class children taught with the Distar Language program in kindergarten will continue to achieve significantly higher scores on achievement and IQ tests, through first grade, than will middle class children who received the traditional kindergarten language program.

Hypothesis 2. Middle class children taught with the Distar Reading program in kindergarten will continue to achieve significantly higher scores on reading and spelling achievement tests, through first grade, than will middle class children who received the traditional kindergarten program.

Hypothesis 3. Middle class children taught with the Sullivan Programmed Reading program in kindergarten will continue to achieve significantly higher scores on reading and spelling achievement tests than will middle class children who received the traditional program.

Hypothesis 4. Middle class kindergarten children taught with structured reading programs (Distar Reading or Sullivan Programmed Reading) will be better adjusted to school than will middle class children who received the unstructured traditional kindergarten program as measured by the Child Behavior Rating Scale.

The Subjects

Two hundred out of the original 303 subjects in the kindergarten study were followed up through the first grade. Seventy-nine subjects were lost to the study by attrition due largely to transfers out of the school district or transfers to parochial schools. Twenty-four subjects were lost to the study due to a teacher turnover during the school year. The remaining 200 subjects were assigned to 14 first grade classes in five elementary schools. The subjects were randomly assigned to eleven of the classes within the limits of school busing requirements. The subjects who were in the kindergarten experimental reading programs were purposely assigned to three classes where the experimental reading programs were continued in first grade.

The Teachers

Eleven first grade teachers taught the traditional first grade reading program. Four first grade teachers were assigned to teach the experimental reading programs which were begun in kindergarten.

The teacher factor was controlled for the overall effect of kindergarten treatment by assigning some experimental subjects and some control subjects to every class. The experimental teachers were for the most part less experienced than the teachers of the traditional first grade program.

Unfortunately, one of the first grade teachers assigned to teach the Distar Reading Program resigned during the experiment. The teacher who replaced her was not trained to teach the Distar Program. Since the Distar Program has unique features which require teacher training, it was necessary to drop the subjects from this class from the study.

The Treatments

During the kindergarten study there were three different experimental (structured) programs which were compared with the control (unstructured) program of the traditional kindergarten. The experimental programs were Distar Language, Distar Reading, and Sullivan Programmed Reading. In the first grade follow-up study, most of the subjects, both experimental and control, were assigned to the traditional first grade program. The Distar Language program was not continued in first grade.

All of the subjects from the language program went into the traditional first grade program. The experimental reading programs were continued through the first grade for some of the subjects, while the remaining subjects went into the traditional first grade program. The distribution of subjects is illustrated in the first grade experimental design, see Table 34.

Three treatments were used covering the following programs of instruction for the first grade subjects:

1. The Sullivan Programmed Reading series.
2. The Distar Reading Program, Level 1 and Level 2.
3. The traditional first grade program which includes both the Economy Phonetic Keys reading program and the Ginn Basic Readers series.

Treatment 1, Programmed Reading. Subjects in two first grade classes, n=41, received instruction in reading, using the Sullivan Programmed Reading Program for approximately one hour each school day. This program has already been described in detail in Chapter II.

The teachers using this program reported that many of the experimental subjects had regressed over the summer and that it was necessary to institute an intensive review of the skills taught in kindergarten. Many of the children were given the Text-workbook 1A, as a review text, rather than Book 3 which

TABLE 34

Experimental Design for First Grade

Follow-up Study

Distar Language

Grade		Kindergarten	
		Exp Distar Language	Con Traditional
First Grade	n	32	37
	Tr	Traditional	Traditional

N=69

Distar Reading

Grade	Kindergarten		
	Treatment	Exp Distar Reading	Con Traditional
First Grade	Distar Reading	n 11	n 10
	Traditional	20	21

N=62

Programmed Reading

Grade	Kindergarten		
	Treatment	Exp Programmed Rdg.	Con Traditional
First Grade	Programmed Reading	n 27	n 14
	Traditional	13	15

N=69

TOTAL N=200

they should have been ready for. After several weeks of review, most of the experimental subjects picked up the momentum they had achieved in kindergarten and moved ahead rapidly. By the end of first grade, most of the experimental subjects had completed Book 10 or beyond in this program, which is the equivalent of the middle of second grade.

The children were encouraged to move ahead at their own pace. As a result, each class soon spread apart into about six or seven small groups in which children worked at the book level they were at. This provided a truly individualized approach to reading instruction. At times certain basic skills were taught to the entire class or to small sub-groups, depending on the needs of the class.

The control children who had not received a structured reading program in kindergarten, were started at the beginning of the Sullivan Programmed Reading series. During the school year, many of the control children were grouped with experimental children for instruction.

Treatment 2, Distar Reading. Subjects in one first grade class, n=21, received instruction in basic reading skills, using the S.R.A. Distar Reading Program for a period of about one hour each school day. The Distar Reading Program is described in detail in Chapter II.

This program provides for a review at the beginning of

first grade which was very helpful for the experimental subjects. The Level I Distar Program had not been completed during kindergarten so the experimental subjects started at about the middle of Level I and completed up to about the middle of Level II during the study.

The control children who had not received formal reading instruction in kindergarten but who were assigned to the Distar Reading Program in first grade were started at the beginning of the Level I Program. However, during the school year, some of the control children were grouped with some of the experimental children for instruction. This was possible because some of the control children were apparently able to move ahead quickly.

Treatment 3, Traditional First Grade Reading Program. Subjects in eleven first grade classes, $n=138$ received instruction in developmental reading, using the Economy Phonetic Keys plus the Ginn Basic Readers series for a period of approximately one hour each school day. The program is considered traditional because it makes use of the widely used basal reader approach to reading instruction. This approach presents whole-words, and an emphasis on meaning from the outset of instruction. The whole word, meaning-emphasis approach has been well described by Chall (1968). The basal approach is modified by the use

of a supplementary phonics program, the Economy Program, which makes up somewhat for the lack of phonics instruction in the Ginn basal series.

The Economy Reading Program is used primarily to provide an intensive phonics program as a supplement to the Ginn Basic Readers series. The Economy method is essentially one of presenting letter sounds and generalizations, having the pupils identify phonetic elements in whole words and discover that the generalizations are applicable, and extending the application of phonetic principles to the analysis of new words. The method offers a thinking approach to word perception rather than one which depends upon the sheer memorization of word forms and their sound equivalents.

Since the vowel is the basic unit in the syllable and since most consonants depend upon vowels for their specific sounds, this method starts with the presentation of the long and short sounds of the vowels. Then it introduces the sounds of the consonants and a few consonant blends, along with a means of putting sounds together to form a meaningful unit - a word. By learning vowel sounds first, the pupil is able to sound words in the early stages of the readiness period. The procedure in this method is based on the assumption that word-analysis skills should be developed along with a vocabulary that can be identified by analysis.

Activities presenting a consistent pattern of repetition and progression in difficulty are included to establish basic word perception and comprehension skills. Vocabulary development is consistently stressed both in word-perception activities and in the expanded vocabularies of the stories. Comprehension skills are carefully built through a variety of exercises that are gradually extended and increased in complexity as the stories become longer and more difficult in content.

The Ginn reading program is used primarily to develop a basic sight vocabulary and develop comprehension skills. The phonics part of the program is introduced gradually, beginning with phonetic-readiness work, such as listening for initial consonant sounds and rhyming elements; continuing with initial and final consonants, consonant blends and digraphs in the first grade; noticing vowel differences in the second grade; and syllabication in the third grade.

Word recognition is developed by the use of picture and context clues; by the teacher presenting new words in a meaningful context and by frequent repetition of each new word in the stories. To assure mastery through frequent repetition, each new word is used five times or more in the text.

Comprehension and study skills are stressed throughout the program. The following skills are developed systematically:

1) ability to define a specific purpose for reading; 2) skill in locating information; 3) ability to comprehend and organize what is read; 4) ability to select and evaluate information; 5) ability to adjust the method of reading to one's purpose and to the nature of the material; 6) skill in using information; and 7) ability to remember what is read.

The first grade Ginn Basic Reader Program includes the following materials and books: testing materials, workbooks, word and picture cards, a readiness book, Fun with Tom and Betty; pre-primers, My Little Red Story Book, My Little Green Story Book, and My Little Blue Story Book; a primer, The Little White House; and a first reader, On Cherry Street.

The first grade Economy Program includes the following materials and books: phonetic cards; charts; picture cards; Tag, the audio-readiness book and pre-primer; Dot and Jim, the primer of the series; and All Around with Dot and Jim, the first reader.

Measures and Test Instruments

The Kuhlmann-Anderson Test (KAT), Booklet A. This test provides for the assessment of general mental ability. It provides an overall mental age and intelligence quotient. Booklet A is standardized on first grade norms.

The Stanford Early School Achievement Test - Level II (SESAT-II).

This is a battery of six subtests which measure: knowledge

of environment, letters and sounds, math, aural comprehension, word reading and sentence reading. Level II is standardized on first grade norms.

The Wide Range Achievement Test (WRAT). There are three subtests which measure: reading, spelling, and arithmetic. The reading subtests must be administered individually. Grade equivalent scores are provided, ranging from nursery to college level.

The Child Behavior Rating Scale (CBRS). This rating scale has been standardized and tested for reliability and validity. The social and school adjustment sections were used to assess the overall school adjustment of the subjects.

Testing Procedures. During the last two weeks of September, all of the subjects were pre-tested with all of the tests mentioned above. During the last two weeks of April, all of the subjects were post-tested with the same tests. All of the group tests were administered by the classroom teachers. The Wide Range Reading subtest was administered on an individual basis by the same two examiners who administered this test in kindergarten. All of the tests were hand-scored. Each test was double-checked at least twice to eliminate any possible errors in scoring.

Statistical Analysis. The raw data of the 24 variables for the entire group of 200 pupils were keypunched on IBM cards

and processed through the Center for Computer and Information Services (CCIS) located at Rutgers-The State University, New Brunswick, New Jersey. The data were computed on the IBM Computer 360/67.

The "t-Test" program of the Statistical Package for the Social Sciences, (SPSS), was applied to all of the 24 variables to obtain mean scores, standard deviations, standard error of the mean, and significant differences in the mean scores between experimental and control subjects.

The BMDX 64, "General Linear Hypotheses" program was applied to 11 major variables to obtain an analysis of covariance on each of the major variables. The major variables are as follows: KAT IQ, WRAT Reading, WRAT Spelling, SESAT II subtests: Environment, Letters and Sounds, Aural Comprehension, Word Reading, and Sentence Reading, SESAT II Total Battery, CBRS School Adjustment and CBRS Social Adjustment.

Kindergarten pre-test scores were used as the covariates and first grade post-test scores as the dependent variables in computing the analysis of covariance to determine any significant differences between experimental and control subjects over the period including kindergarten and first grade.

Two experimental factors were analyzed. . The first factor was the overall effect of treatment used in kindergarten as it affected achievement from the beginning of kindergarten to the end of first grade. There were two levels to this factor: the experimental (structured) kindergarten treatment and the control (unstructured) traditional kindergarten treatment. The second factor was the effect of treatment in first grade. There were two levels to this factor reflecting the two different treatments to which subjects were assigned. All of the subjects both experimental and control were assigned to either the experimental or traditional program in first grade.

The effect of treatment in first grade was not considered in the conclusions because it was not possible to separate out the first grade teacher effect from the first grade treatment effect.

CHAPTER V

Findings: End of First Grade

This chapter presents an analysis of the experimental data and a description of the findings. The primary purpose of the first grade study was to determine whether the significant gains achieved during the kindergarten year were maintained through the first grade. Statistical analyses were used to test the four experimental hypotheses.

The data were computed with a "t" test ot obtain means, standard deviations, "t" values, and two-tail probabilities for each pre- and post-test. The computed "t" test data for each of the major variables are shown in Tables 35, 36, 37, 38, 39 and 40 in Appendix IV.

An analysis of covariance was computed to obtain adjusted means, and F-ratios on all of the major variables. The findings for each of the hypotheses are presented below.

Hypothesis 1

Middle class children taught with the Distar Language Program in kindergarten will continue to achieve significantly higher scores on achievement tests and IQ tests, through first grade, than will middle class children who received the traditional kindergarten language program.

To test this hypothesis pre- and post-tests were administered during the first grade. The experimental

language program was not continued in first grade. Instead both the experimental subjects, n=32, and the control subjects, n=37, received the traditional first grade program.

The first grade pre- and post-test scores were computed with a "t" test. An analysis of covariance was computed using the kindergarten pre-IQ Test as a covariate and the first grade post-tests as dependent variables. The results of the statistical analysis are described below:

Effect of kindergarten language treatment (Distar Language and Control) on achievement and IQ. The results of the "t" test showed one difference favoring the control subjects on one of the first grade pre-tests, WRAT Reading, as shown in Table 35 in Appendix IV. There were no significant differences found on any of the major variables used during first grade post-testing as shown in Table 36 in Appendix IV.

The results of the analysis of covariance showed no significant differences on any of the major variables. There was no evidence to support Hypothesis one.

Hypothesis 2

Middle class children taught with the Distar Reading Program in kindergarten will continue to achieve significantly higher scores on reading and spelling achievement tests, through first grade, than will middle class children who received the traditional kindergarten program.

To test this hypothesis pre- and post-tests were administered during first grade. The experimental subjects were divided into two different treatment groups. One group, n=11, continued to receive the Distar Reading Program through first grade. The other experimental group, n=20, received the traditional first grade reading program. The control subjects were also divided into two groups. One group, n=10, received the Distar Reading Program while the other control group, n=22, received the traditional first grade reading program. The statistical analysis of the test scores yielded the following results:

Effect of kindergarten treatment (Distar Reading and Control on reading and spelling achievement tests. The results of the "t" test showed that there were significant differences at the .10 level favoring the experimental group on the WRAT Reading and WRAT Spelling Tests at the end of first grade as shown in Table 38 in Appendix IV.

The scores on the WRAT Reading Test were subjected to an analysis of covariance. Kindergarten pre-IQ test scores were used as the covariate. First grade post-test scores were used as the dependent variable. The analysis of covariance showed that the main effect of kindergarten treatment had an F-ratio of 5.47 which is significant beyond the .05 level. The analysis also showed that the main effect of first grade

treatment had an F-ratio of 3.51 which is significant beyond the .10 level. The complete results of the analysis of covariance are shown in Table 41. There was an adjusted mean difference of 12.18 in favor of the experimental group as shown in Table 42.

TABLE 41

Analysis of Covariance of Effect of Kindergarten Treatments (Distar Reading and Control) on First Grade WRAT Reading Scores

Source of Variance	Degrees of Freedom	Mean Squares	F-Ratio
Kindergarten treatment	1	1557.96	5.47**
First Grade treatment	1	998.65	3.51*
Kdg. Tr x F.G. Tr.	1	159.67	.56
Within groups	57	284.80	

* Significant beyond .10
** Significant beyond .05

TABLE 42

Comparison of Adjusted Means on First Grade WRAT Reading Test by Kindergarten Treatments (Distar Reading and Traditional)

Grade		K I N D E R G A R T E N			
		EXP Distar Reading		CON Traditional	
First Grade	Treatment	Distar Rdg.	Traditional	Distar Rdg.	Traditional
	Number	11	20	10	21
	Adjusted Mean	126.66	121.62	119.29	107.36
	Combined Mean	123.39		111.21	
	Difference	12.18			

The scores on the WRAT Spelling Test were subjected to the analysis of covariance. Kindergarten pre-IQ test scores were used as the covariate. First grade post-test scores were used as the dependent variable. The results of the analysis showed that the main effect of kindergarten treatment has an F-ratio of 7.42 which is significant beyond the .01 level. The analysis also showed that the main effect of first grade treatment had an F-ratio of 4.84 which is significant beyond the .05 level. The complete results of the analysis of covariance are shown in Table 43.

TABLE 43

Analysis of Covariance of Effect of Kindergarten Treatments (Distar Reading and Control) on First Grade WRAT Spelling Scores

Source of Variance	Degrees of Freedom	Mean Squares	F-Ratio
Kindergarten Treatment	1	1070.42	7.42**
First Grade Treatment	1	697.73	4.84*
Kdg. Tr. x F.G. Tr.	1	103.05	.71
Within Groups	57	144.29	

* Significant beyond .05
** Significant beyond .01

There was an adjusted mean difference of 10.10 in favor of the experimental group covering the period from pre-kindergarten through post-first grade testing as shown in Table 44.

TABLE 44

Comparison of Adjusted Means on First Grade WRAT Spelling Test Scores by Kindergarten Treatments (Distar Reading and Traditional)

Grade	K I N D E R G A R T E N			
	EXP Distar Reading		CON Traditional	
	Treatment	Distar Rdg.	Traditional	Distar Rdg.	Traditional
	Number	11	20	10	21
First	Adjusted Means	115.90	111.57	109.70	99.84
Grade	Combined Means	113.12		103.02	
	Difference	10.10			

It appears from the data described above that there is sufficient evidence to support Hypothesis 2. The experimental group (Distar Reading) did achieve significantly higher scores than the control group (Traditional) on both reading and spelling achievement tests.

Hypothesis 3

Middle class children taught with the Sullivan Programmed Reading program in kindergarten will continue to achieve

significantly higher scores on reading and spelling achievement tests, through first grade, than will middle class children who received the traditional kindergarten program.

To test this hypothesis pre-and-post tests were administered during first grade. The experimental subjects were divided into two different treatment groups. One group, n=27, continued to receive the Programmed Reading program through first grade. The other experimental group, n=13, received the traditional first grade program. The control subjects also were divided into two groups. One group, n=14, received the Programmed Reading program for the first time in first grade. The other control group, n=15, received the traditional first grade program. The statistical analysis of the test scores yielded the following results:

Effect of kindergarten treatment (Programmed Reading and Control) on reading and spelling achievement tests. The result of the "t" test showed that there was a significant difference at the .03 level favoring the experimental group on the WRAT Spelling first grade pre-test as shown in Table 39 in Appendix IV. There was a significant difference at the .01 level favoring the experimental group on the SESAT Sentence Reading post-test as shown in Table 40 in Appendix IV.

The scores on the SESAT Sentence Reading Test were subjected to an analysis of covariance. Kindergarten pre-IQ Test scores were used as the covariate. First grade post-test

scores were used as the dependent variable. Results of the analysis showed that the main effect of kindergarten treatment has an F-ratio of 7.73 which is significant beyond the .01 level. The results of the analysis of covariance are shown in Table 45. There was an adjusted mean difference of 5.58 in favor of the experimental group as shown in Table 46.

TABLE 45

Analysis of Covariance of Effect of Kindergarten Treatments (Programmed Reading and Control) on First Grade SESAT Sentence Reading Scores

Source of Variance	Degrees of Freedom	Mean Squares	F-Ratio
Kindergarten Treatment	1	430.86	7.73*
First Grade Treatment	1	63.99	1.15
Kdg. Tr. x F.G. Tr.	1	4.84	.09
Within Groups	64	55.76	

*Significant beyond the .01 level

TABLE 46

Comparison of Adjusted Means on First Grade SESAT Sentence Reading Test Scores by Kindergarten Treatments (Programmed Reading and Control)

Grade		K I N D E R G A R T E N			
		EXP Programmed Rdg.		CON Traditional	
	Treatment	Programmed Reading	Traditional	Programmed Reading	Traditional
First Grade	Number	27	13	14	15
	Adjusted Means	30.30	28.87	25.67	23.08
	Combined Means	29.84		24.26	
	Difference	5.58			

It appears from the data presented above that there is sufficient evidence to support the portion of Hypothesis 3 relating to pupil achievement on reading achievement tests. The experimental group (Programmed Reading)did achieve significantly higher scores on a reading achievement test.

Hypothesis 4

Middle class kindergarten children taught with structured reading programs (Distar Reading or Sullivan Programmed Reading) will be better adjusted to school than will middle class children who received the unstructured traditional kindergarten program.

To test this hypothesis each pupil, experimental and control, who was in an experimental reading program was rated on the social and school adjustment portion of the child Behavior Rating Scale. Ratings were conducted by the classroom teachers at the beginning and end of first grade. The scores on the Rating Scale were subjected to statistical analysis. The statistical analysis produced the following results:

Effect of kindergarten treatment (Distar Reading and Traditional on pupil adjustment to school. The results of the "t" test showed that there was a significant difference at the .06 level favoring the experimental group on the CBRS Social Adjustment post-test as shown in Table 38. Although it was not significant there also was a substantial

difference favoring the experimental group on the CBRS School Adjustment post test as shown in Table 38 in Appendix IV.

The scores on the CBRS Social Adjustment Scale were subjected to the analysis of covariance. Kindergarten pre-CBRS scores were used as the covariate and first grade post-CBRS scores as the dependent variable. Results of the analysis showed that the main effect of kindergarten treatment had an F-ratio of 11.90 which is significant beyond the .01 level. The results of the analysis of covariance are shown in Table 47.

TABLE 47

Analysis of Covariance of Effect of Kindergarten Treatments (Distar Reading and Control) on First Grade CBRS Social Adjustment

Source of Variance	Degrees of Freedom	Mean Squares	F-Ratio
Kindergarten Treatment	1	1855.52	11.90*
First Grade Treatment	1	2.76	.02
Kdg. Tr. x F.G. Tr.	1	178.97	1.15
Within Groups	57	155.98	

*Significant beyond .01 level

The scores on the CBRS School Adjustment Scale were subjected to the analysis of covariance. Kindergarten pre-CBRS scores were used as the covariate and first grade post-CBRS scores were the dependent variable. Results of the analysis showed that the main effect of kindergarten treatment had an F-ratio of 5.38 which is significant beyond the .05 level. The results of the analysis are shown in Table 48.

TABLE 48

Analysis of Covariance of Effect of Kindergarten Treatments (Distar Reading and Control) on First Grade CBRS School Adjustment

Source of Variance	Degrees of Freedom	Mean Squares	F-Ratio
Kindergarten Treatment	1	469.69	5.38*
First Grade Treatment	1	3.08	.04
Kdg. Tr. x F.G. Tr.	1	1.96	.02
Within Groups	57	87.33	

*Significant beyond the .05 level

Effect of kindergarten treatment (Programmed Reading and Control) on pupil adjustment to school. The results of the "t" test showed that there was a significant difference beyond the .10 level favoring the experimental group on the CBRS Social Adjustment post-test as shown in Table 38.

The scores on the CBRS Social Adjustment Scale were

subjected to the analysis of covariance. Results of the analysis showed that there were no significant differences between the experimental and control groups.

Effect of kindergarten treatments (Distar Reading and Programmed Reading on pupil adjustment to school. The results of the "t" test showed that the children who were in experimental reading programs in kindergarten were rated higher on all of the measurements of adjustment than the controls during the first grade. Both Distar Reading and Programmed Reading subjects were rated significantly higher on the CBRS Social Adjustment Scale at the end of first grade as shown in Table 49.

TABLE 49

Comparison of the Effect of Kindergarten Treatments (Structured Reading Programs and Controls) on CBRS Pupil Adjustment in First Grade

		Pre-Tests		Post-Tests	
Variable	Treatment	Mean	"t" Value	Mean	"t" Value
CBRS Social Adjustment	Distar Reading	103.26	.60	111.710	1.92*
	Control	100.63		103.958	
CBRS School Adjustment	Distar Reading	62.03	1.10	64.452	1.35
	Control	59.63		60.542	
CBRS Social Adjustment	Programmed Reading	105.600	.63	113.350	1.81*
	Control	103.862		108.793	
CBRS School Adjustment	School Adjustment	61.275	.56	64.725	.41
		59.966		63.793	

*Significant beyond the .10 level

It appears from the data presented above that there is sufficient evidence to support Hypothesis 4. The experimental reading groups did score substantially higher on all of the measurements used with the Child Behavior Rating Scale. The experimental Distar Reading group was rated significantly higher on the CBRS Social and School Adjustment Scale than the control group which received the traditional informal kindergarten program.

Additional Findings

The results of testing showed a number of significant differences on several variables which were not directly related to the hypotheses. These additional findings are presented below.

Additional findings for Distar Reading. The results of the "t" test showed that there were significant differences at the .01 level favoring the control group on SESAT Aural Comprehension pre-and-post-first grade tests. The results also showed a significant difference at the .05 level favoring the control group on SESAT Environment pre-first grade test, and a significant difference at the .01 level favoring the control group on SESAT Environment first grade post-test. There was a significant difference at the .09 level favoring the control group on the KAT IQ first grade post-test. The data for the above mentioned variables are shown in Tables 37 and 38 in Appendix IV.

Additional findings for Programmed Reading. The analysis of covariance was applied to the scores of the SESAT Total Battery. Results showed that the main effect of treatment had an F-ratio of 3.00 which is significant beyond the .10 level. The results are illustrated in Table 50. There was a difference of 8.05 between the adjusted means as shown in Table 51.

TABLE 50

Analysis of Covariance of Effect of Kindergarten Treatments (Programmed Reading and Control) on First Grade Total SESAT Battery Scores

Source of Variance	Degrees of Freedom	Mean Squares	F-Ratio
Kindergarten Treatment	1	1054.68	3.00*
First Grade Treatment	1	77.45	.22
Kdg. Tr. x F.G. Tr.	1	165.64	.47
Within Groups	64	351.38	

*Significant beyond .10 level

TABLE 51

Comparison of Adjusted Means on First Grade Total SESAT Battery by Kindergarten Treatments (Programmed Reading and Control)

Grade		K I N D E R G A R T E N			
		EXP Programmed Reading		CON Traditional	
	Treatment	Programmed Reading	Traditional	Programmed Reading	Traditional
First Grade	Number	27	13	14	15
	Adjusted Means	219.64	220.80	214.86	209.28
	Combined Means	220.02		211.97	
	Difference	8.05			

CHAPTER VI

Conclusions and Recommendations

The main purpose of this experimental study was to determine whether middle class kindergarten pupils who received structured direct instruction in language and reading would achieve significantly higher achievement and adjustment test scores than middle class pupils who received the traditional informal kindergarten program. The findings at the end of the kindergarten year supported three of the four major hypotheses as reported in Chapter III. The study was continued through first grade in order to determine whether the kindergarten treatments had any long term effects.

Conclusions based on the findings reported in Chapter III and Chapter V are presented below. The conclusions deal with the main effect of kindergarten treatment as it affected achievement and adjustment at the end of kindergarten and at the end of first grade. Conclusions reached for each of the four major hypotheses follow below.

Hypothesis 1

Hypothesis 1 stated that middle class children taught with the Distar Language program in kindergarten will achieve significantly higher scores on achievement and IQ Tests than will middle class children who received the traditional kindergarten program.

The findings at the end of kindergarten supported the part of this hypothesis dealing with IQ. The Distar Language program did have a real effect on producing superior IQ growth as measured by the Kuhlmann-Anderson Test. The data analysis showed a significant difference beyond the .10 level in favor of the experimental group. For the portion of the hypothesis dealing with achievement, there was not sufficient evidence to support the hypothesis.

The findings at the end of first grade did not support the hypothesis. There were no significant differences found on IQ or academic achievement. It appears that the initial superior IQ growth attained in kindergarten by the experimental group was not maintained in the traditional first grade program. Whether this was due to the fact that the experimental treatment was not continued in first grade or to the tendency of test scores to regress to the norm is a matter for speculation. There was not sufficient evidence from this study to either prove or disprove Hypothesis 1.

Hypothesis 2

Hypothesis 2 stated that middle class children taught with the Distar Reading program in kindergarten will achieve significantly higher scores on reading and spelling achievement tests than will middle class children who received the traditional kindergarten program.

The findings at the end of kindergarten supported that part of this hypothesis which deals with reading achievement. There was sufficient evidence to substantiate the conclusion that the Distar Reading program had a real effect on producing superior reading achievement, as measured by the Wide Range Achievement Test. The data analysis showed a significant difference beyond the .01 level in favor of the experimental group. There was not sufficient evidence to either prove or disprove the part of the hypothesis dealing with spelling achievement.

The findings at the end of first grade supported the hypothesis in its entirety. There was sufficient evidence to substantiate the conclusion that the Distar Reading program used in kindergarten had a real effect on producing superior reading and spelling achievement through first grade as measured by the Wide Range Achievement Test. The data showed a significant difference beyond the .05 level on the WRAT Reading Test and a significant difference beyond the .01 level on the WRAT Spelling Test in favor of the experimental group. On the basis of this evidence Hypothesis 2 is accepted.

Hypothesis 3

Hypothesis 3 stated that middle class children taught with the Sullivan Programmed Reading program in kindergarten will achieve significantly higher scores on reading and spelling

achievement tests than will middle class children who received the traditional kindergarten program.

The findings at the end of kindergarten supported the hypothesis. There was sufficient evidence to substantiate the conclusion that the Programmed Reading program had a real effect on producing superior achievement in reading and spelling as measured by the Wide Range Achievement Test. The data analysis showed a significant difference beyond the .01 level in favor of the experimental group on both the WRAT Reading and WRAT Spelling tests.

The findings at the end of first grade supported the portion of the hypothesis dealing with reading achievement. There was sufficient evidence to substantiate the conclusion that the Programmed Reading program used in kindergarten had a real effect on producing superior achievement in reading in first grade as measured by the SESAT Sentence Reading subtest. The data analysis showed a significant difference beyond the .01 level in favor of the experimental group.

Although the experimental group had substantially higher scores on the WRAT Spelling Test the differences were not significant. There was not sufficient evidence to either prove or disprove the portion of this hypothesis which deals with spelling achievement at the end of first grade. There was sufficient evidence to support the portion of the hypothesis

dealing with reading. On the basis of the evidence presented above the portion of Hypothesis 3 dealing with reading achievement is accepted.

Hypothesis 4

This hypothesis states that the middle class children in the experimental (structured) reading programs in kindergarten will be better adjusted to school than the children who received the traditional (unstructured) kindergarten program as measured by the Child Behavior Rating Scale.

Findings at the end of kindergarten showed that there were no significant differences between any of the treatment groups. It is of interest to note that the experimental subjects who received the Programmed Reading program were rated substantially higher than the controls at the end of kindergarten.

Findings at the end of first grade supported the hypothesis. Experimental subjects in both the Distar Reading and Programmed Reading programs were rated substantially higher than the controls on the CBRS Social and School Adjustment pre-and-post-first grade tests. The data analysis covering the period from kindergarten pre-testing to first grade post-testing showed that the experimental Distar Reading group achieved significantly higher scores beyond the .01 level on the CBRS Social

Adjustment Scale. The data analysis also showed a significant difference beyond the .05 level in favor of the Distar Reading experimental group on the CBRS School Adjustment Scale.

On the basis of the evidence presented above Hypothesis 4 is accepted.

Additional Conclusions

The findings from this study provided sufficient evidence to reach tentative conclusions about two hypotheses which were not stated with the original major hypotheses of this study. One of these minor hypotheses can be stated as follows:

Middle class kindergarten children with a mental age below six years-six months can learn to read without adverse effects.

There is substantial support for this hypothesis from the evidence presented in this study. Analysis of mental ages of the kindergarten subjects showed that most of the children in this study had a mental age below six years-six months at the beginning of kindergarten. The results of the study showed that most of the children learned to read without any adverse effects. The significantly higher scores on reading achievement tests and on the pupil adjustment measures favoring the experimental groups indicates that young middle class children can learn to read without adverse effects.

The second minor hypothesis can be stated as follows:

There will be no significant differences between middle

class kindergarten boys and girls on reading achievement test scores as the result of certain structured reading programs (Distar Reading or Programmed Reading).

The findings at the end of kindergarten tend to support this hypothesis. An analysis of the data at the end of kindergarten showed no significant interactions between the sex factor and treatment. The boys appeared to do as well as the girls in both of the experimental reading programs.

Implications of the Study

There are several major implications which appear to be worthy of consideration from the results of this study. The implications to be considered are as follows: (1) success in reading and early structured reading instruction; (2) readiness and early structured reading instruction; and (3) pupil adjustment to school and early structured reading instruction.

Success in reading and early structured reading instruction. The results of this study suggest that structured instruction in basic reading skills is superior to informal reading readiness activities in producing higher reading achievement for middle class kindergarten children. This conclusion must be tempered with caution, however. It does not mean that every structured reading program is suitable or desirable for all kindergarten children. Metzger (1970) pointed out that she would not use the typical basal reader for beginning reading instruction with

pre-school children. Metzger did use i.t.a. for teaching four and five year olds to read with great success.

There is a common factor present in the experimental reading programs used in this study and i.t.a. The common factor is the consistent phoneme-grapheme relationship in the vocabulary that is used. This factor may be of key importance in the selection of reading materials for kindergarten children. Other common factors in the experimental programs used in this study are the slow pacing and frequent repetition of concepts and skills. Both experimental programs also provide positive reinforcement by utilizing immediate feedback, and control for successful experiences for each child. To summarize, great care should be exercised in the selection of a structured reading program for the kindergarten. It is essential that young children experience success in their first exposure to learning to read.

Readiness and early structured instruction. Another factor which must be considered in relation to early structured reading instruction is that of readiness. Traditionalists have generally frowned upon the use of any formal instruction in kindergarten. They take the position that most kindergarten children are not ready for reading in kindergarten. Theorists such as Hall, Gesell, and Piaget have popularized the view that maturation develops in stages and that instruction cannot hasten maturation. These views have had the effect of

discouraging efforts to improve young children's cognitive abilities, and also to delay instruction in many subjects until later ages.

In contrast to the views of the traditionalists and developmentalists, there are those such as Bereiter and Engelmann who take the position that lack of readiness indicates lack of knowledge or skill which can be overcome by intensive structured instruction geared to the requirements of the subject matter. It is of interest to note that most of the children who were in this study did appear to benefit from the highly structured reading programs. On the basis of a teacher questionnaire it was determined that only about 20% of the children were considered to be not ready for the reading programs. This contrasts sharply with the number of children who are usually considered ready for reading in kindergarten. It is possible that the kinds of reading programs used did meet the needs of many more children than is commonly the case with other kinds of reading programs. This is purely speculative and does indicate the need for further research into the question of readiness.

To summarize, the results of this study indicate that a large percentage of middle class kindergarten children are ready to benefit from the type of reading programs used in this study. It is suggested that there is no need to delay formal

reading instruction until first grade on the basis of the results of this study.

Pupil adjustment to school and early structured reading instruction. Results from this study indicate that the pupils in the structured reading programs in kindergarten were better adjusted to school during first grade than the controls. This suggests that children who were in the informal readiness type program in kindergarten were not as well prepared for first grade as the children who were in structured programs in kindergarten. It appears that the experimental reading programs used in this study may have developed certain habits or attitudes which were helpful in preparing the experimental pupils for a more successful first grade adjustment than was provided for the controls in the informal traditional kindergarten. The habits of listening, following directions, and of completing assigned tasks may be important factors in helping the kindergarten child to adjust to the first grade.

Recommendations

The first recommendation is that the subjects in this study be followed for at least another two years. We cannot be certain at this time that the long term effects are permanent. It is possible that the superior achievement of the experimental reading subjects may regress and become level with the control subjects over a longer period of time.

Another recommendation is that serious consideration should be given to the inclusion of structured reading programs at the kindergarten level with due care being taken to select those reading programs which research indicates are effective for kindergarten. This recommendation should not be taken to mean that the entire kindergarten curriculum should be structured. There is obviously a need for other kinds of experience for kindergarten children. The tendency to go from one extreme to the other should be avoided.

There is a need for further research into the value of structured, direct instruction in basic skill subjects such as reading, writing and arithmetic as compared to informal readiness or discovery approaches at the kindergarten level. There is some evidence to suggest that an important factor in successful learning at early ages is the element of order and consistency which are characteristics of the structured reading programs used in this study.

The area of sex in relationship to success in reading should be carefully studied to determine just which factors need to be taken into consideration in order to assure that boys will do as well as girls in learning to read at the early stages.

The area of language ability in relation to cognitive growth is one of great interest. This study did not indicate that middle class children taken as a whole benefit from an

intensive language program. However, it may be possible that an intensive language program would be of value to those kindergarten children who are identified as having language deficits. Research along this line would be of value.

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APPENDIX I

EAST BRUNSWICK PUBLIC SCHOOLS
McGinnis School

QUESTIONNAIRE

Name_____

Date_____

I. Background Information

1. How long have you lived in East Brunswick?_____

2. Where did you live prior to East Brunswick?_____

   How long did you live there?_____

3. Did you reside in (a) an apartment (b) one family home (3) two family home?_____

4. Has the sewerage line been linked to your
   a. Street (Yes, No.)
   b. Home (Yes, No.)

5. Number of people living in your home_____

6. List names of children and ages.

Name	Age	Name	Age
_____	_____	_____	_____
_____	_____	_____	_____

7. Type of Employment:

   a. father_____ b. mother_____
   full or part-time_____

8. Educational background:
   Father 1._____Grade School 2._____High School
   3._____College 4._____College Degree
   5._____Other

   Mother 1._____Grade School 2._____High School
   3._____College 4._____College Degree
   5._____Other

APPENDIX II

Table 6

A Comparison of Means and Standard Deviations for Major Variables by Treatment
Distar Reading

		Experimental				Control			
	Tests Pre- Post-	Teacher 3		Teacher 4		Teacher 3		Teacher 4	
Test		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
KAT IQ	Pre-	102.96	11.55	104.00	12.22	104.13	13.69	106.92	11.37
	Post-	119.36	19.38	110.15	19.89	110.12	14.41	117.84	16.27
SESAT I ENV.	Pre-	28.28	5.54	30.58	6.58	29.64	6.95	33.28	3.53
	Post-	34.32	3.09	35.46	4.01	36.40	3.18	37.04	3.12
SESAT I TOTAL	Pre-	72.00	17.30	76.31	16.68	78.16	19.27	85.44	14.14
	Post-	97.48	12.20	101.88	25.71	102.08	10.01	100.32	13.87
WRAT READ.	Pre-	---	---	---	---	---	---	---	---
	Post	113.84	12.69	106.73	11.58	105.48	8.18	103.92	7.54
WRAT SPELL	Pre-	---	---	---	---	---	---	---	---
	Post-	103.04	11.41	95.19	13.55	96.92	9.96	101.40	8.48
CBRS SCHOOL ADJUST	Pre-	52.16	4.66	60.77	6.13	49.96	6.54	66.44	5.59
	Post-	56.92	5.10	65.92	5.11	53.76	5.48	67.88	3.78

Table 7

A Comparison of Means and Standard Deviations for Major Variables by Treatment
Distar Language

		Experimental				Control			
		Teacher 1		Teacher 2		Teacher 1		Teacher 2	
Test	Tests Pre- Post	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
KAT IQ	Pre-	104.83	12.86	105.28	10.31	105.54	11.46	106.80	12.42
	Post-	122.92	16.20	124.08	14.28	120.13	14.44	119.84	17.75
SESAT I ENV.	Pre-	31.59	4.75	33.12	3.59	32.00	4.14	31.84	4.71
	Post-	37.38	3.87	38.15	1.64	36.00	3.28	35.60	4.37
SESAT I TOTAL	Pre-	82.59	16.28	85.96	12.58	82.67	14.86	82.16	15.39
	Post-	103.50	11.97	105.00	11.19	103.33	10.62	99.12	16.10
WRAT READ	Pre-	101.08	10.21	102.44	11.33	102.88	12.75	103.04	11.58
	Post-	102.08	7.96	103.96	9.00	105.79	6.76	106.12	9.54
WRAT SPELL	Pre-	87.96	12.35	87.84	13.90	80.17	18.14	86.44	22.99
	Post-	95.42	8.56	97.81	7.92	94.58	7.25	99.44	9.69
CBRS SCHOOL ADJUS.	Pre-	56.71	5.17	60.00	2.52	56.17	3.92	60.08	3.34
	Post	58.92	2.92	55.58	5.76	56.75	4.50	57.40	3.28

Table 8

A comparison of Means and Standard Deviations for Major Variables by Treatment
Programmed Reading

		Experimental				Control			
		Teacher 5		Teacher 6		Teacher 5		Teacher 6	
Test	Pre-Post-	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
KAT IQ	Pre-	105.76	15.26	106.28	11.74	108.36	15.66	104.25	6.98
	Post-	128.52	13.93	121.68	15.71	117.16	16.13	117.46	9.39
SESAT I EDUC.	Pre-	31.52	4.65	30.75	6.55	28.16	5.41	31.79	13.69
	Post-	38.48	7.85	37.32	3.35	37.20	3.49	36.67	5.74
SESAT I TOTAL	Pre-	87.00	15.62	79.50	18.27	78.68	16.70	81.92	16.84
	Post-	103.64	12.55	106.30	12.30	104.20	13.33	104.33	12.97
WRAT READ.	Pre-	---	---	---	---	---	---	---	---
	Post-	111.80	8.90	113.10	13.87	102.80	8.32	104.79	9.18
WRAT SPELL.	Pre-	---	---	---	---	---	---	---	---
	Post-	106.56	6.96	106.20	9.96	99.64	14.50	99.21	9.76
CBRS SCH. ADJUS	Pre-	67.72	5.06	68.78	6.96	63.24	10.20	69.04	4.54
	Post-	58.83	12.16	53.64	13.39	48.24	16.48	56.96	8.16

APPENDIX III

Table 33

A Comparison of the Effect of Structured and Non-structured Programs of Instruction on CBRS Social Adjustment Means

	Distar Language			
	Teacher 1		Teacher 2	
	exp.	con.	exp.	con.
N	24	24	25	25
Pre-Test Mean Score	96.88	93.38	95.80	94.12
Post-Test Mean Score	98.87	96.83	96.50	93.60
Change	1.99	3.45	.70	-.52
Difference	1.46		0.18	
Adjusted Mean Difference	2.49			

	Distar Reading			
	Teacher 3		Teacher 4	
	exp.	con.	exp.	con.
N	25	25	25	26
Pre-Test Mean Score	89.12	85.04	114.85	112.20
Post-Test Mean Score	96.16	92.32	110.54	112.04
Change	7.04	7.28	-4.31	-.16
Difference	0.24		4.15	
Adjusted Mean Difference	0.43			

	Programmed Reading			
	Teacher 5		Teacher 6	
	exp.	con.	exp.	con.
N	25	25	24	25
Pre-Test Mean Score	112.68	109.52	115.00	114.08
Post-Test Mean Score	97.83	78.00	94.64	93.20
Change	-14.85	-31.52	-10.36	-20.88
Difference	16.67		10.52	
Adjusted Mean Difference	6.66			

APPENDIX IV

TABLE 35

COMPARISON OF THE EFFECT OF KINDERGARTEN TREATMENT (DISTAR LANGUAGE AND CONTROL) ON FIRST GRADE ACHIEVEMENT

PRE-TESTS

VARIABLE	Tr	N	MEAN	SD	"t"VALUE	2-TAIL PROBABILITY
KAT	EXP	32	111.906	11.090		
					.15	.884
IQ	CON	37	111.460	13.830		
SESAT	EXP	27	25.556	4.685		
					-.38	.705
ENVIRONMENT	CON	31	25.968	3.545		
SESAT	EXP	27	29.852	8.379		
					-.13	.901
LETTERS	CON	31	30.129	8.449		
SESAT	EXP	27	16.963	4.090		
					-.21	.837
AURAL COMPREHENSION	CON	30	17.200	4.506		
SESAT	EXP	32	28.500	11.559		
					.59	.556
WORD READING	CON	36	26 917	10.505		
SESAT	EXP	27	135.259	33.671		
					.81	.423
TOTAL BATTERY	CON	31	128.484	30.293		
WRAT	EXP	32	98.313	8.082		
					-1.86	.067
READING	CON	37	102.108	8,755		
WRAT	EXP	31	93.097	10.656		
					-1.40	.166
SPELLING	CON	37	96.487	9.293		

TABLE 36

COMPARISON OF THE EFFECT OF KINDERGARTEN TREATMENT (DISTAR LANGUAGE AND CONTROL) ON FIRST GRADE ACHIEVEMENT

POST-TESTS

VARIABLE	Tr	N	MEAN	SD	"t" VALUE	2-TAIL PROBABILITY
KAT	EXP	32	123.125	14.983		
					.10	.918
IQ	CON	37	122.757	14.523		
SESAT	EXP	32	29.969	3.248		
					.94	.349
ENVIRONMENT	CON	37	29.162	3.775		
SESAT	EXP	32	38.375	2.393		
					-1.35	.182
LETTERS	CON	37	39.135	2.207		
SESAT	EXP	32	20.563	2.539		
					-1.23	.223
AURAL COMPREHENSION	CON	37	21.270	2.244		
SESAT	EXP	32	52.125	7.465		
					-1.10	.273
WORD READING	CON	37	53.838	5.362		
SESAT	EXP	32	27.125	9.638		
					.12	.906
SENTENCE READING	CON	37	26.838	10.284		
SESAT	EXP	32	215.719	23.003		
					-.29	.773
TOTAL BATTERY	CON	37	217.297	22.120		
WRAT	EXP	11	109.545	13.156		
					.31	.763
READING	CON	9	107.444	17.544		
WRAT	EXP	11	103.545	9.964		
					-.06	.953
SPELLING	CON	9	103.889	15.520		

TABLE 37

COMPARISON OF THE EFFECT OF KINDERGARTEN TREATMENT (DISTAR READING AND CONTROL) ON FIRST GRADE ACHIEVEMENT

PRE-TESTS

VARIABLE	Tr	N	MEAN	SD	"t" VALUE	2-TAIL PROBABILITY
KAT	EXP	31	112.161	10.383		
					-.95	.344
IQ	CON	31	115.000	12.936		
SESAT	EXP	24	24.333	3.864		
					-2.03	.048
ENVIRONMENT	CON	26	26.577	3.931		
SESAT	EXP	24	31.292	7.613		
					.53	.596
LETTERS	CON	26	30.115	7.936		
SESAT	EXP	24	16.21	2.963		
					-3.46	.001
AURAL COMPREHENSION	CON	26	18.96	2.661		
SESAT	EXP	31	30.71	15.434		
					1.42	.162
WORD READING	CON	28	25.54	12.213		
SESAT	EXP	24	133.71	34.216		
					.43	.666
TOTAL BATTERY	CON	26	129.73	30.503		
WRAT	EXP	31	102.35	8,913		
					1.21	.233
READING	CON	31	100.03	5,964		
WRAT	EXP	31	95.19	11.797		
					-.39	.695
SPELLING	CON	31	96.13	5.965		
CBRS	EXP	31	103.26	13.765		
					.12	.904
SOCIAL ADJUSTMENT	CON	31	102.77	17.330		
CBRS	EXP	31	62.03	7.906		
					1.33	.188
SCHOOL ADJUSTMENT	CON	31	59.36	7.914		

TABLE 38

COMPARISON OF THE EFFECT OF KINDERGARTEN TREATMENT (DISTAR READING AND CONTROL) ON FIRST GRADE ACHIEVEMENT

POST-TESTS

VARIABLE	Tr	N	MEAN	SD	"t" VALUE	2-TAIL PROBABILITY
KAT	EXP	31	117.516	11.880		
					-1.71	.092
IQ	CON	31	123.000	13.282		
SESAT	EXP	31	27.742	4.389		
					-2.78	.007
ENVIRONMENT	CON	31	30.581	3.622		
SESAT	EXP	31	38.355	2.905		
					-.41	.686
LETTERS	CON	31	38.613	2.028		
SESAT	EXP	31	19.452	2.743		
					-2.84	.006
AURAL COMPREHENSION	CON	31	21.484	2.897		
SESAT	EXP	31	53.839	4.345		
					.95	.344
WORD READING	CON	31	52.645	5.450		
SESAT	EXP	31	26.774	9.667		
					.75	.455
SENTENCE READING	CON	31	24.871	10.269		
SESAT	EXP	31	213.194	22.975		
					-.47	.641
TOTAL BATTERY	CON	31	215.839	21.501		
WRAT	EXP	31	121.323	18.442		
					1.70	.095
READING	CON	31	113.290	18.810		
WRAT	EXP	31	111.258	11.986		
					1.80	.077
SPELLING	CON	31	104.871	15.743		
CBRS	EXP	31	111.710	19.195		
					1.89	.063
SOCIAL ADJUSTMENT	CON	31	104.871	17.349		
CBRS	EXP	31	64.452	9.165		
					1.19	.237
SCHOOL ADJUSTMENT	CON	31	61.323	11.341		

TABLE 39

COMPARISON OF THE EFFECT OF KINDERGARTEN TREATMENT (PROGRAMMED READING AND CONTROL) ON FIRST GRADE ACHIEVEMENT

PRE-TESTS

VARIABLE	Tr	N	MEAN	SD	"t" VALUE	2-TAIL PROBABILITY
KAT	EXP	40	114.775	12.626		
					.13	.893
IQ	CON	29	114.345	13.730		
SESAT	EXP	38	26.026	4.390		
					-.20	.841
ENVIRONMENT	CON	24	26.250	4.067		
SESAT	EXP	38	31.474	7.766		
					1.78	.081
LETTERS	CON	24	27.583	9.334		
SESAT	EXP	38	16.947	3.246		
					-.50	.622
AURAL COMPREHENSION	CON	24	17.333	2,514		
SESAT	EXP	40	29.225	14.068		
					1.25	.214
WORD READING	CON	28	25.000	13.089		
SESAT	EXP	38	137.816	31.369		
					1.27	.209
TOTAL BATTERY	CON	24	127.625	29.806		
WRAT	EXP	40	105.275	15.701		
					.98	.332
READING	CON	29	102.000	10.372		
WRAT	EXP	40	100.700	9.271		
					2.20	.031
SPELLING	CON	29	95.586	9.833		
CBRS	EXP	40	105.600	11.948		
					.63	.528
SOCIAL ADJUSTMENT	CON	29	103.862	10.176		
CBRS	EXP	40	61.275	9.868		
					.56	.575
SCHOOL ADJUSTMENT	CON	29	59.966	9.018		

TABLE 40

COMPARISON OF THE EFFECT OF KINDERGARTEN TREATMENT (PROGRAMMED READING AND CONTROL) ON FIRST GRADE ACHIEVEMENT

POST-TESTS

VARIABLE	Tr	N	MEAN	SD	"t" VALUE	2-TAIL PROBABILITY
KAT	EXP	40	121.450	14.544		
					-.27	.790
IQ	CON	29	122.379	13.870		
SESAT	EXP	40	30.375	3.705		
					.30	.763
ENVIRONMENT	CON	29	30.103	3.648		
SESAT	EXP	40	38.000	2.470		
					-.05	.964
LETTERS	CON	29	38.035	3.850		
SESAT	EXP	40	20.175	3.054		
					-1.15	.254
AURAL COMPREHENSION	CON	29	20.966	2.457		
SESAT	EXP	40	53.975	5.890		
					.74	.462
WORD READING	CON	29	52.897	6.097		
SESAT	EXP	40	29.750	7.808		
					2.51	.014
SENTENCE READING	CON	29	24.448	9.701		
SESAT	EXP	40	219.750	22.342		
					1.30	.198
TOTAL BATTERY	CON	29	212.345	24.741		
WRAT	EXP	40	124.275	22.091		
					1.27	.209
READING	CON	29	118.069	25.867		
WRAT	EXP	40	114.400	16.044		
					1.40	.167
SPELLING	CON	29	109.241	13.770		
CBRS	EXP	40	113.350	8.854		
					1.81	.075
SOCIAL ADJUSTMENT	CON	29	108.793	12.099		
CBRS	EXP	40	64.725	8.782		
					.41	.680
SCHOOL ADJUSTMENT	CON	29	63.793	9.829		